

# A I AUTOMOTIVE INDUSTRIES

PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY  
PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT • SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT  
ENGINEERING • PRODUCTION • MANAGEMENT

APRIL 1, 1950

## *In This Issue . . .*

Willys F Head Engine

Assembling 86 Oldsmobiles an Hour

New Offenhausen for Indianapolis Race

ASTE Coast Catflag Expedition

British Diesel Under 5 Lb per Hp

Complete Table of Contents, Page 3

A CHILTON PUBLICATION

## What's YOUR problem?



**D. R. Clay**, lubrication specialist at Standard Oil's Grand Rapids office, solved this problem.

He is one of a corps of Standard Oil lubrication specialists located throughout the Midwest to provide "on-the-spot" service to plant operators. One of these lubrication specialists is near your plant. He has plenty of practical experience and has been specially trained for his job in a Standard Oil Lubrication Engineering School. You can obtain his services quickly and easily. Just phone or drop a card to the nearest Standard Oil Company (Indiana) office. Why not arrange, now, to discuss with him the advantages offered by these widely accepted lubricants?

**STANOIL Industrial Oils**—This multipurpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

**SUPERLA Greases**—Available in all consistency grades, SUPERLA Greases cover a wide range of applications. These products are comparable in quality to the highest type of special greases but are as readily available and economical as ordinary cup greases.

**CALUMET Viscous Lubricants**—On open gears and wire rope, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and chains, better internal lubrication of wire rope.

**STANORUST Rust Preventives**—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specifically developed for its intended use. The grades range from a finger print remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

## Stops trouble on steam joints . . .

● Lubrication of the telescopic steam joints on a hot-plate veneer press was a continual problem for a midwest manufacturer. The job required a grease that would withstand temperatures of 240° to 260° F. and the severe washing action of steam and water.

Conventional greases failed to meet these requirements. Joints had to be lubricated frequently. This interfered with production and resulted in excessive consumption of the lubricant.

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of resisting the washing action of water. Since the switch to STANOLITH the joints have been lubricated between shifts with no interruption of production. *Lubricant consumption has been reduced 40%.*

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Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois.

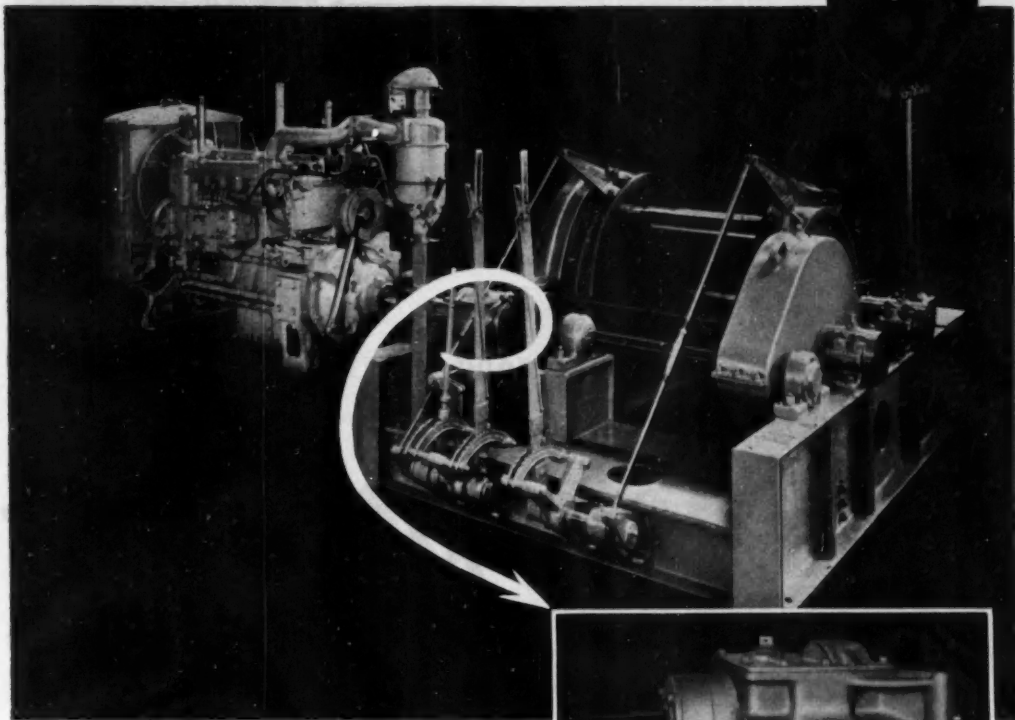
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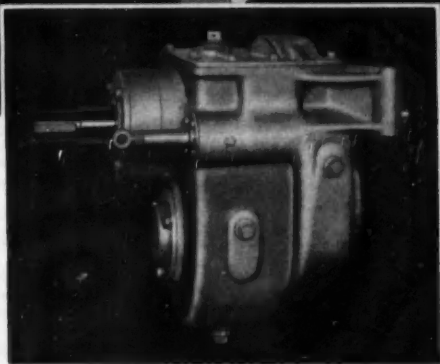


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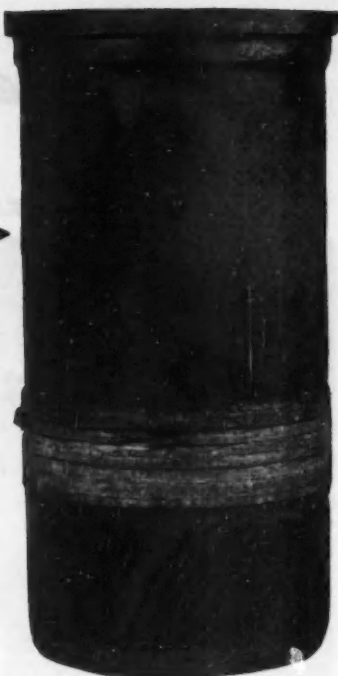
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NEW YORK 5, N. Y.**



# AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

April 1, 1950

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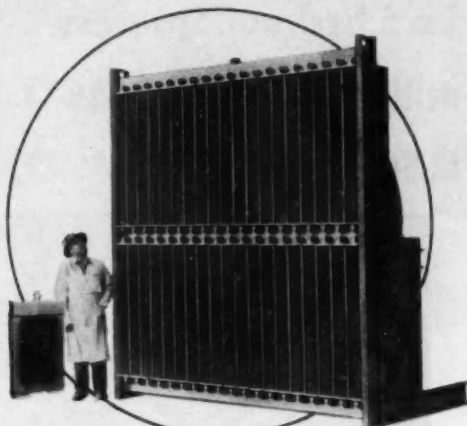
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AUTOMOTIVE INDUSTRIES, April 1, 1950

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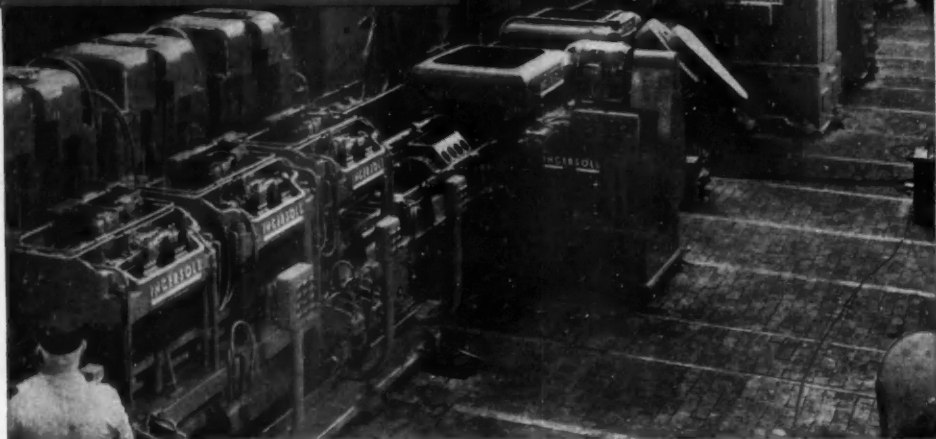
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REGAL OILS (R & O)**



*Photo courtesy of The Ingersoll Milling Machine Company*

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\*Name of this Texaco user on request

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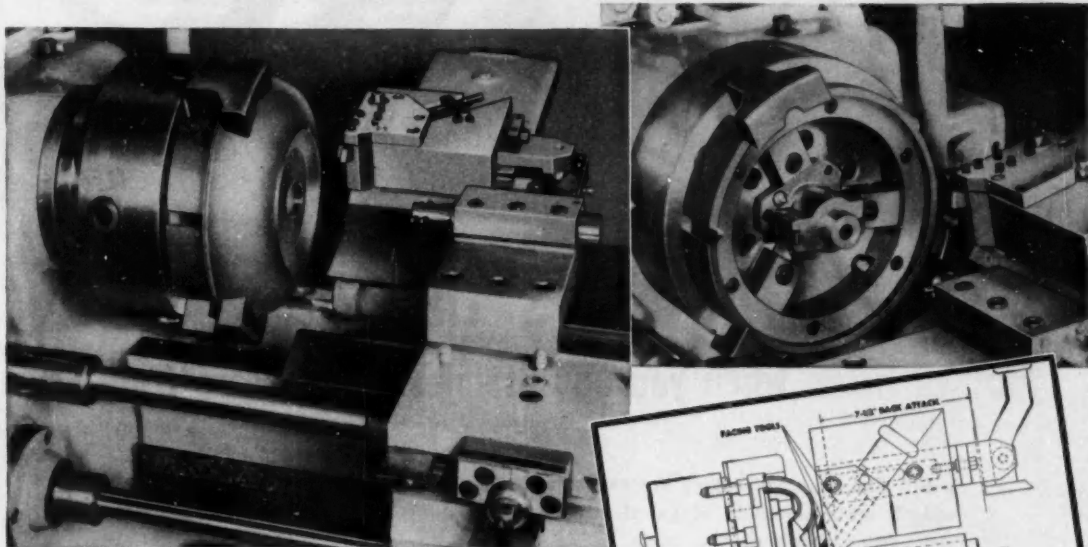
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**Solution:** The Model LR Automatic Lo-swing Lathe was selected for this job and special tooling developed. The upper left illustration shows the work in position, held by a 3-jaw universal chuck. Facing Tools can be seen on the Back Attachment and the Boring Bar, with two cutters, on the Front Carriage Slide.

A Cutting-off Tool is visible in the upper right illustration and is shown also in the tooling layout. The unusual location and mounting of this Cutting-off Tool permits the removal of a ring of waste metal from the

inside of the coupling, thus eliminating a second operation and a second chucking of the part. It is a non-revolving Tool, mounted on a heavy bar which runs through a hollow headstock spindle. Its longitudinal movement, or feed, is obtained through a cam driven by the regular feed cycle of the machine.

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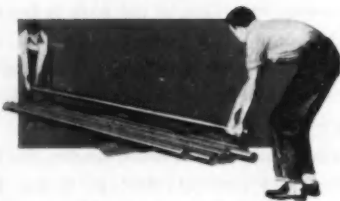
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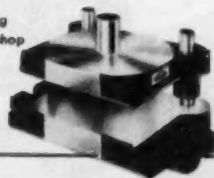
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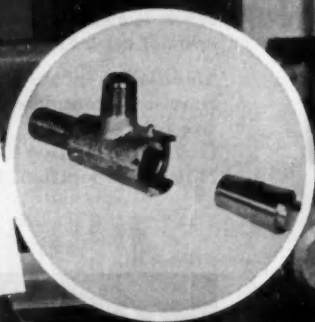
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PRODUCTION**

*... for instance:*

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In circle to right: Brass valve body and plug finished by precision boring and turning operations on Ex-Cell-O Style 1212-A Standard Double End Precision Boring Machine.



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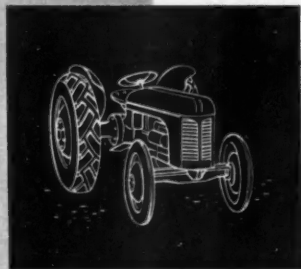
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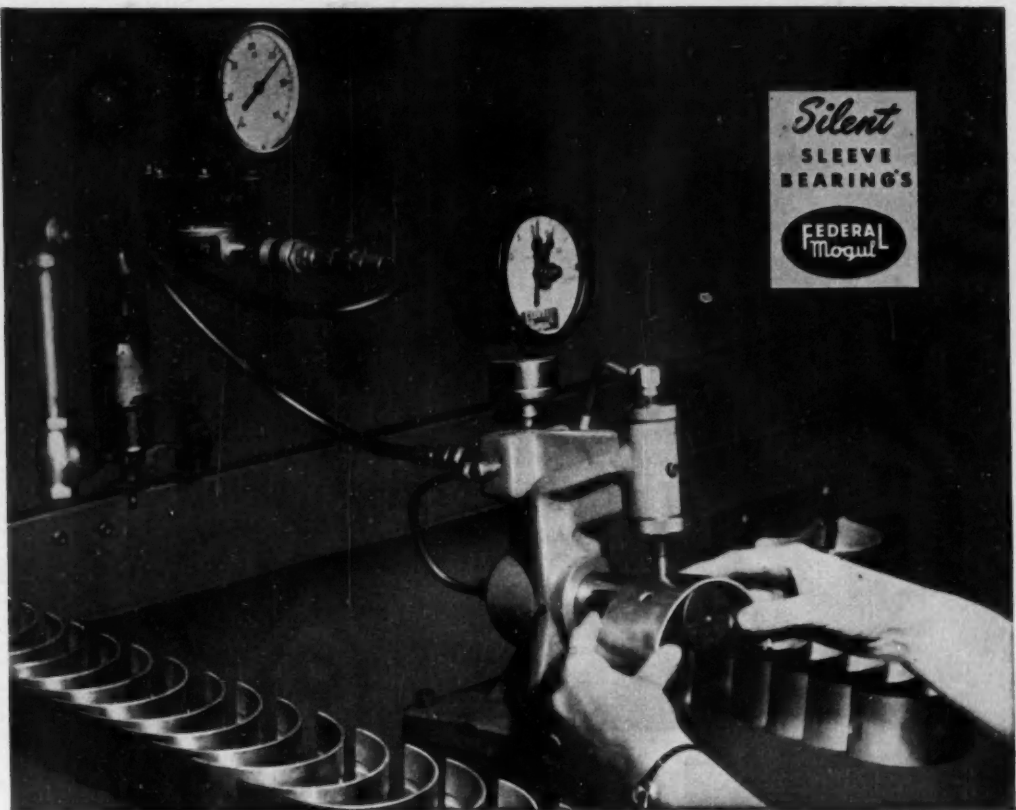
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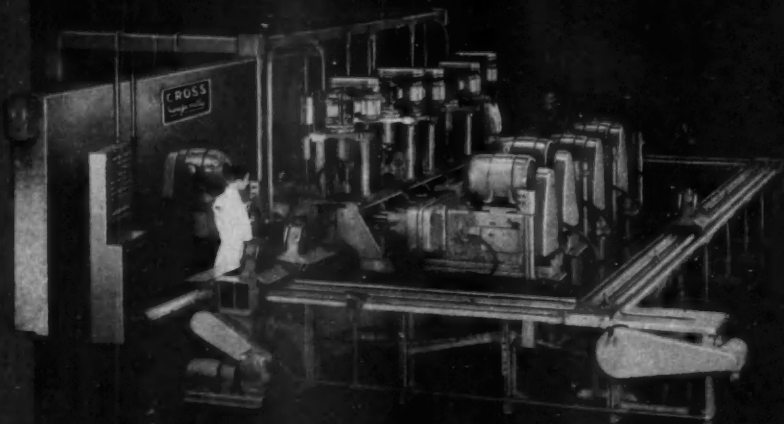
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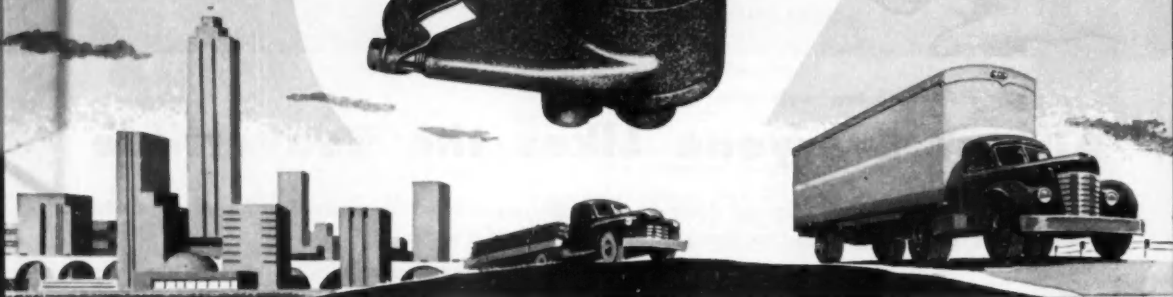
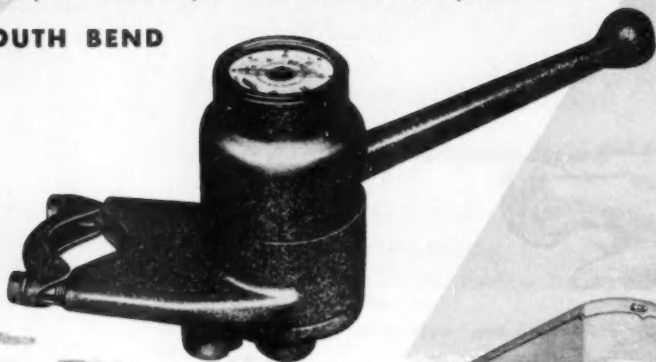
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OF BETTER  
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# AUTOMOTIVE INDUSTRIES

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## High Spots of This Issue

### ★ New Diesel Engine Weighs Under 5 Lb Hp

The Meteorite high-speed Diesel engine produced by the Rover Co. of Birmingham, England, features compact V-8 design and extensive use of light alloys. It is said to have the most favorable power-weight ratio of any Diesel yet built. Interesting mechanical details are given, starting page 30.

### ★ Willys Introduces F-Head Engine

In their 1950 models Willys-Overland Motors, Inc., includes two new engines of higher compression ratio and offers increased performance throughout the entire line. One of the models—a four-cylinder F-Head type—is the first example of an F-Head engine to be placed in production in the U. S. currently. See page 34.

### ★ Rotors and Turbine Wheels for Jet Engines

Allison has assumed sole responsibility for the engineering development of the U. S. Air Force J-33 jet engine since October 1945. This study describes and illustrates how rotors and turbine wheels are being made for the newest Allison 400 jet engine. Page 38.

### ★ 80 Oldsmobiles an Hour

On the 500,000 sq ft of productive floor space in Oldsmobile's modernized Rocket engine plant practically all manual handling of cars and parts has been eliminated. Placed in operation in December 1949 it is one of the most advanced car assembly plants in the industry. This account deals with some very remarkable methods of mechanization and conveyerization found there. Page 42.

### ★ 42 New Product Items And Other High Spots, Such As:

Mechanical changes in the Canadian Nash; facts about the Rover gas turbine car; the SAE Detroit meeting; a new Offenhauser engine for the Indianapolis race; cost-cutting methods to be emphasized at the Tool Engineers Show; a schedule of ASTE technical sessions; and a section on new products at the ASTE Exposition.

**AUTOMOTIVE  
INDUSTRIES**

Reg. U. S. Pat. Off.

AUTOMOTIVE INDUSTRIES, April 1, 1950

News of the Automotive Industries, Page 17  
For Complete Table of Contents, See Page 3



# Saving Strokes

## MAKES A BETTER PRODUCTION SCORE

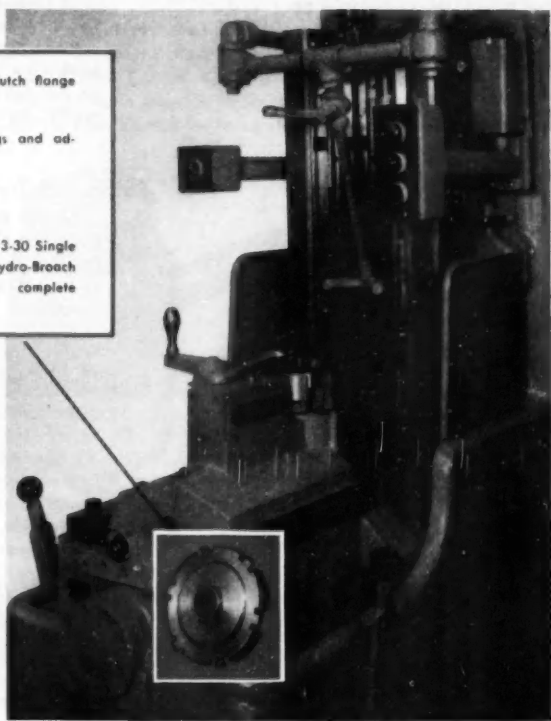
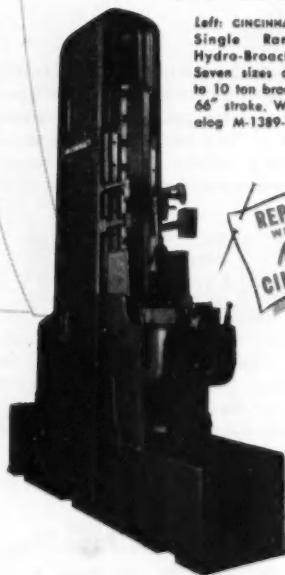
Saving strokes on the golf course nets a lower score; on a broaching machine, a higher rate of production. The machine illustrated here, a CINCINNATI No. 3-30 Single Ram Vertical Hydro-Broach, makes a better production score by broaching three lugs on the part illustrated in one stroke of the ram. ¶ Like many other low cost broaching installations, the work of Cincinnati Application Engineers is evident here. They devised the broach holder with three sets of inserts (cutters), and a simple two-posi-

tion hand clamping index fixture. Each downward stroke of the ram accurately broaches three lugs and the adjacent slots on the periphery of clutch flanges. ¶ Expanded production schedules are not necessary to gain the benefits offered by broaching. Perhaps you can replace present equipment with CINCINNATI Hydro-Broach Machines and continue at the same rate of production at a lower cost. It's well worth investigating, and our field engineers will help you. May we hear from you?

Part name ..	Transmission clutch flange
Material ....	Steel
Operation ..	Broach six lugs and adjacent slots
Depth of cut. $\frac{3}{64}$ "	
Production ..	60 per hour
Equipment ..	CINCINNATI No. 3-30 Single Ram Vertical Hydro-Broach Machine with complete tooling

Left: CINCINNATI No. 3-48 Single Ram Vertical Hydro-Broach Machine. Seven sizes available, up to 10 ton broaching force, 66" stroke. Write for Catalog M-1389-2.

REPLACE WITH A NEW CINCINNATI



# Cincinnati



MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES  
 FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID  
 THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

# News of the AUTOMOTIVE INDUSTRIES

Vol. 102, No. 7

April 1, 1950

## New Production Record Likely in April, May

Production of cars and trucks during and immediately after the coal strike held up amazingly well, and is now again picking up speed rapidly, indicating that the effects of the coal strike are not nearly as drastic as had been feared. Ford and GM have resumed six-day operations, and chances are good that Chrysler will be contributing a goodly total to this month's output. A new monthly high production record in April seems assured. It is likely that all records will fall during April and May, but June is definitely a question mark because of the cloud hanging over the GM labor negotiations.

## Automotive Makers Got Record Amount of Steel in 1949

Setting a record, more steel than ever before was shipped to automotive manufacturers who took nearly 700,000 tons more last year than in 1948. Total shipments to this industry in 1949 were more than 10.9 million net tons, or 18.8 per cent of total steel shipments, compared with 13.4 to 15.5 per cent of shipments in other postwar years, according to the American Iron and Steel Institute.

## Studebaker Now Has Third Lowest Priced Car

Studebaker is making a bold and determined bid in the market dominated by the Big Three with its new custom model Champion priced \$75 below the regular de luxe line (see cut on this page). In its new price range, Studebaker now has the third lowest priced car, being \$60 above the Chevrolet Special, \$75 above the Ford De Luxe six, but \$23 below the Ford De Luxe eight, and \$50 under the Plymouth De Luxe. The saving in cost by the stripping down process is far less than the \$75 deduction in price, however. Optional equipment available on other models will be offered on the custom as will the same color selections with the exception of maroon and cream. The car will be offered in four-door, two-door, five-passenger coupe, and three-passenger coupe models. Dealer dis-

counts are shaved one per cent on the custom to a maximum of 25 per cent. Studebaker is admittedly putting the lower priced line in production now as part of a long-range program. Initial production will be about 20 per cent of all Champion production, but will not be additional output since supplies of steel will currently not permit expanded operations until some time in May. The factory list price of the new model is as follows: Four-door, \$1415; two-door, \$1385; five-passenger coupe, \$1410; and three-passenger coupe, \$1320.

tetraethyl lead. The primary purpose, it is stated, is to meet the octane requirements of the higher compression ratio passenger car engines now on the road. An advertising campaign is being planned, and dealer meetings are being scheduled. Sun will continue its one-brand gasoline policy.

## GM 1949 Earnings Highest on Record

In reporting highest sales and net profit in its history, GM points out that the increase was the result of greater



## STRIPPING A CHAMPION

*This new custom model Studebaker Champion could be called a stripped down model with hood ornament, stone guard and chrome window reveals omitted from the exterior, while in the interior, arm rests have been omitted, there is less chrome on the instrument panel, less expensive upholstery material is used, and the dome light is operated from a hand switch instead of lighting automatically when the doors open.*

## K-F Starts Production of 1951 Kaiser Model

Kaiser-Frazer has started production of its new 1951 Kaiser models and is rapidly approaching volume production. Assembly of the 1951 Frazer started early in March. Both lines are getting into production ahead of schedule.

## Sun Oil Selling Dynafuel With Tetraethyl Lead

According to newspaper advertisements, the Sun Oil Co. is beginning to market its Dynafuel gasoline with

physical volume and also was due in part to inflation. Net income totaled \$656,434,232, representing about 11.5 per cent profit on sales of more than \$5.7 billion. The statement also points out that GM paid or accrued total taxes of \$580 million during the year or about 88 per cent as much as its earnings. When state and local taxes, social security taxes and sales and excise taxes are included, total levies on GM products last year amounted to \$879 million, recalling a statement by Alfred P. Sloan, board chairman, early this year, that "it would seem the government should encourage that sort of performance."



# News of the AUTOMOTIVE



## STEEL IN STYLE

*This new 1950 Pontiac steel station wagon, combining the versatility of a station wagon with the advantages of a sedan, is available in standard and de luxe models. Both are available with six or eight-cyl engines and with Hydra-Matic transmission as optional equipment.*

## Chicago Testing Twin Coach Bus Operating on Butane-Propane

The Twin Coach Co. and the Chicago Transit Authority are currently experimenting with a bus which has been modified to operate on Butane-Propane. With the exception of a special carburetor and fuel tank, the bus is a standard 44-passenger coach. It is equipped with a Fageol engine with a compression ratio of 10 to 1.

## 1950 Car Sales Boom Off To Early Start

Automobile sales executives have been happily confounded by new car sales performance since the first of the year. Retail car sales have been booming far beyond expectations with the result that most companies have had difficulty in building up stocks for the normal heavy spring selling season. The heavy demand appears to be gaining month by month and how long it will continue before dropping off is anyone's guess. Reports from several companies show the trend. Retail deliveries of Ford cars and trucks in January and February totaled more than 214,000 and were the highest for the same two month's period since 1924, and were 48 per cent higher over the same period a year ago. Even more surprising was the record made on Ford trucks sold, 42,869, which was the best January and February performance in the company's history except for those two months in 1941.

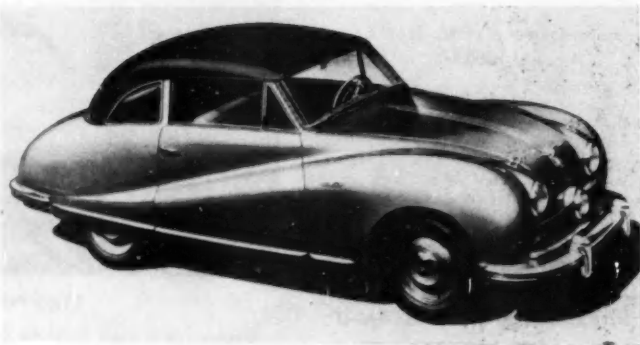
Mercury is also establishing new sales records with deliveries during the first ten days of March about 12 per cent greater than the previous all-time high recorded during the last ten days

of February, and 94 per cent greater than in the same period of last year. February, although the shortest month of the year, was the best in history, exceeding by 10 per cent the

by 49,416 units, and 47 per cent above the same period a year ago. February sales also were highest on record for that month, exceeding the previous peak set in February, 1941, by 30,000 units. Studebaker had its greatest retail sales month in history during February, exceeding last September, previous high month, by seven per cent and totaling 99 per cent more than February, 1948. Oldsmobile is also keeping pace, with the first ten days of March showing retail sales of 11,622 cars, a gain of 64 per cent over the first ten days of March a year ago. Jan. 1 through March 10 of this year, Oldsmobile retail deliveries were 60 per cent greater than during the same period of 1949.

## Burlington Mills Opens Detroit Office

Burlington Mills, Inc., Burlington, Wis., makers of automotive felts, has announced the opening of its Detroit office in the Stephenson Building. Hugh H. Loud will be the Detroit sales manager.



## SPORT TO BOW

*Going on display for the first time in the U. S. at the British Automobile Show, to be held in New York City from April 15-23, the new Austin Sports Sedan model will have the same type 88-hp engine used in Austin's Atlantic convertible. The new Austin is styled on the lines of the Atlantic except that the roof is permanent. The body is of steel and aluminum construction.*

previous record month of last December. Buick reports that during the first ten days of March, retail sales were 61 per cent ahead of the same period last year, and 31 per cent greater than the last ten days of February. Up to the middle of March, Buick sales totaled 89,461, or 31 per cent ahead of the same period in 1949. Buick also had the greatest February sales in its history. Chevrolet, top producer in the field, reports that in the first ten days of March, sales were highest in history for that period for both cars and trucks

## Goodrich Develops New Cold Rubber Process

The B. F. Goodrich Chemical Co. reveals that it has developed a continuous process manufacturing method for producing cold rubber. The company says that the new method gives greater uniformity in quality than has been possible under the previous batch system procedure. The new process is being used at the Port Neches, Tex., plant which is currently producing at the rate of 30,000 tons a year.

# INDUSTRIES

## Betting Even on GM Chances For Strike

Seasoned labor observers in Detroit think that there is a 50-50 chance that GM may be struck by the UAW-CIO this year in support of union demands totaling 31 cents an hour for pensions and other benefits. The GM contract expires May 21 and preliminary talks are already getting underway. Principal economic demands of the union call for pensions of \$125 a month at age 65 including primary social security benefits (\$25 a month more than has been granted so far in the industry) to be financed entirely by the corporation, to be funded through fixed payments by GM, and to be administered by a joint board of administration with equal representation by both parties and an impartial chairman. Other demands are hospitalization and medical care for workers and families with cash benefits for temporary disability and maternity cases, death benefits, rehabilitation training and paid up life insurance upon retirement, severance pay allowance, increase in vacation allowance, and a wage increase of nine cents an hour brought about by elimination of alleged differential between GM and the industry and an increase in the annual improvement factor of the contract to eight cents an hour.

Other items include triple time for holiday work, double time for Sunday work and time and a half for Saturday work. Another important feature of this year's negotiations will be the demand for a union shop, which is expected to precipitate a bitter fight. Also under discussion will be a number of non-economic improvements in the contract. The union several months ago announced that it would attempt to throw out the cost-of-living formula in effect the last two years.

## Curtiss-Wright Gets \$12 Million in Orders from USAF

A \$1.4 million contract for modification of an unspecified number of B-29 bombers has been awarded by the U. S. Air Force to the Curtiss-Wright Corp. of Columbus. Curtiss-Wright was also given an \$11 million contract involving installation and spare prop assemblies, controls and blade assemblies, and spare parts for B-36 aircraft. Texas Engineering & Mfg. Co. has been given a contract for \$150,000 for overhauling 20 T-6 aircraft.

Other recent purchase contracts awarded by the USAF included: General Electric Co., BH-1 turbosuperchargers and spare parts and CH7-B1 turbosuperchargers, \$2,871,305; Lear

Inc., Grand Rapids, an F-5 autopilot, \$1,808,391; and General Motors Corp., unspecified quantity, type AC181 spark plugs, \$555,388.

## Wright Gets Engine Orders Totalling \$3 Million

The Wright Aeronautical Corp. has received orders totaling about \$3 million for Cyclone engines to power Air Force trainer and rescue aircraft and commercial airliners. The bulk of the engines to be built are 800-hp Cyclone 7's which will power the North American T-28's, high-performance trainers. The orders also included more 1425-hp Cyclone 9's for the Grumman SA-16 Albatross. Also included in the contracts were a number of 2500-hp Cyclone 18BD engines which will be used as spares in the expanding fleet of Lockheed Constellation passenger transports of commercial airlines.

## Gas Turbine Automobile At British N. Y. Show

The much discussed gas turbine car built by the Rover company of England will be on display at the British Automobile and Motorcycle Show in New York City, April 15 to 23. The turbine will be fitted with a transparent cover for exhibition purposes. Automobile

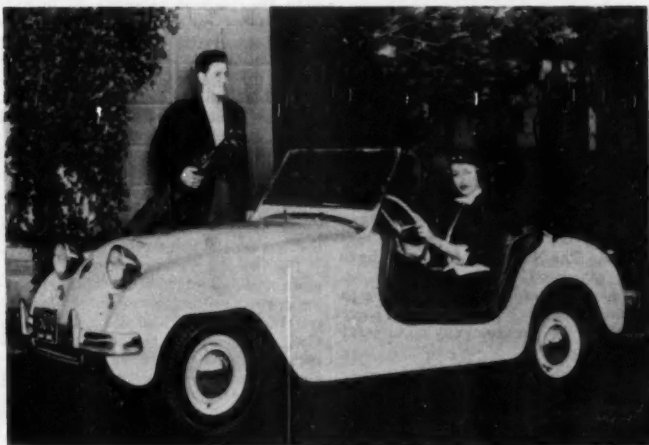
engineers are not particularly excited about the announcement of the turbine car, pointing out that there is still considerable work needed to lick the problems of noise, heat, fumes, and high fuel consumption.

## Wynn Oil to Sponsor Two Cars in Indianapolis Race

Wynn Oil Co. will sponsor the two Kurtis-Kraft cars in the 1950 Indianapolis race. The cars will be called the Wynn Friction Proofing Specials. Johnny Parsons, 1949 AAA racing champ, will drive one car and Fred Agabashian, another high point driver, will pilot the second car.

## Court Reverses Decision in GM Franchise Case

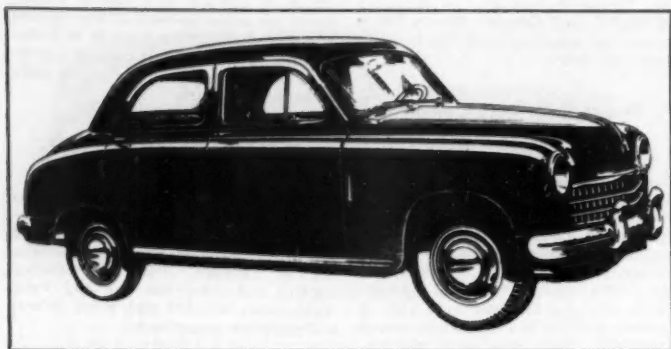
In a decision important to all of the automobile industry, the U. S. Circuit Court of Appeals in Chicago has reversed a \$1,236,000 judgment against GM obtained by a former Chevrolet dealer whose contract was cancelled. The court remanded the case for a new trial and at the same time rebuked the original trial judge for error and laid down some specific rules for admission of evidence in a retrial suit. The dealer charged that his franchise was revoked because he refused to accept financing



## SPORT FOR TWO

With a list price of under \$1000, the two-seater Crosley Super Sport car has a road clearance of 7 in., and aircraft-type seats. Powered by the Crosley four-cyl engine with 7.8 to 1 compression ratio, it has combined leaf and coil spring rear suspension, and strut-type hydraulic shock absorbers.

# News of the AUTOMOTIVE



## CELEBRATES AN ANNIVERSARY

*Fiat celebrated its 50th anniversary on March 16 at its Turin, Italy, plant by presenting a new four-cyl, 45-hp passenger car. Named the "1400", it contains several novel mechanical features and is styled to reconcile American design with European tastes. The new Fiat also made its bow at the same time at the opening of the automobile salon being held in Geneva, Switzerland.*

through GMAC, a GM subsidiary. The company had contended that the franchise was revoked because of bad customer practices rather than for any reasons of disagreement over financing. The court held that GM had not been given an adequate opportunity to present evidence of its reasons for revoking the franchise.

### Twin Coach May Consolidate Bus Operations in Buffalo

The head of the Twin Coach Co. in Kent, O., is thinking about consolidating the company's bus manufacturing operations in Buffalo, N. Y. Chairman F. R. Fageol of Twin Coach said that the company could save \$350,000 a year by the move. John J. Lee of Buffalo, vice president and general manager of Twin Coach, said that the company has made surveys regarding possible expansion. The Buffalo plant would have to be expanded, if the company decides to shift the Kent bus operation to Buffalo, he said. Twin Coach's factory in Buffalo is the company's Aircraft Div.

### Nash and Ford UAW Agreements Most Significant

Two significant developments in labor affecting the automobile industry occurred about the middle of March. The first was the agreement between Nash and the UAW-CIO providing a fully-funded five-year pension plan with a seven cents per hour commit-

ment for that purpose, and a year-to-year insurance program. Combined cost under the agreement is 10 cents an hour. The other major development was the agreement reached by Ford and the UAW-CIO on the disputed cents-per-hour provision of its contract signed last fall. Under the agreement, Ford has won its point that it is committed to pay into the fund only the amount required to provide the benefits called for in the pension agreement during its duration. The cost is estimated at 8½ cents per hour under the present social security set-up and if Federal funds are increased the Ford contribution could be reduced a proportionate amount or the company may elect to reduce the period for funding past service costs. Thus, the union has won from Nash its cherished objective of a definite cents-per-hour pension commitment, but has lost out on the same point at Ford.

The Nash agreement provides maximum pensions of \$100 a month, including social security benefits for workers retiring at age 65 and 25 years of service, and reduced pensions for those retiring with less than 25 years of service. Workers may continue to work up to age 68 and beyond that with permission of the company, but with no further accumulation of service credits beyond that age. Service credit is based on seniority for actual service if the latter is greater than seniority accumulated since 1934. A joint board of administration has been set up, consisting of two members each from management and the union and an impartial

chairman. The board will prepare an annual report interpreting the function of the plan to the employees and will receive and decide appeals on eligibility from the joint pension committee at the plant level, consisting of two representatives each of management and the union, which receives and decides eligibility of pension applications. The board, however, will have no control over any money in the fund, which is to be received and disbursed by a trustee selected by the company.

The insurance program is contributory, with employees receiving benefits in proportion to their hourly rates. The company's contribution is limited to 2.6 cents an hour. The insurance agreement is open to negotiation on a year-to-year basis. Life insurance and permanent and total disability benefits range from \$2000 to \$4000 a year, with an average of \$3154. Weekly sickness and accident benefits range from \$18 to \$36 for 26 weeks with an average of approximately \$28. The insurance provision provides paid up life insurance policies for a five-year term for retiring workers, amounting to \$1000 for workers with 25 years of service; \$750 for 20 to 24 years of service, and \$500 for 15 to 19 years of service. The worker must have carried the insurance while he was employed to qualify for these policies.

### Packard Profit Shows 50 Per Cent Drop

The Packard Motor Car Co. reports net income of \$7,706,042 for 1949, a drop of 50 per cent from the high level of 1948. Last year Packard turned out nearly 105,000 cars, the second highest production year in its history. Hugh J. Ferry, Packard's new president, stated that the company is planning a substantial cash layout during the first half of this year as part of its long range plans for a competitive future. It is believed that a considerable part of the expenditures this year will go for tooling 1951 models which are expected to be announced in late summer.

### Martin Gets Orders Totaling \$35 Million for New 4-0-4

Involving about \$35 million, 35 new model Martin 4-0-4's have been ordered by Eastern Air Lines and 30 by Trans World Airline from the Glenn L. Martin Co. The new model Martin 4-0-4 will have a passenger capacity of 40 in a pressurized and air-conditioned cabin. The new 4-0-4 will have a top

# INDUSTRIES

speed at cruising altitudes of 312 mph. and will be powered by two latest type Pratt & Whitney R-2800 CB-16 engines, each delivering 2400 hp with water injection. Propellers will be the latest reversible type. The Martin 4-0-4 is convertible to such new engines as the turbo-propeller jet engine now being produced by GM's Allison Div.

## Ford Invites Suppliers To Study Quality

Ford is pushing its quality control program far afield by inviting 600 selected major suppliers of production parts to the Rouge plant for a two-day training course in statistical quality control. The company believes that normally 15 per cent of defective parts escape inspectors and that with statistical quality control the percentage can be reduced to less than one per cent. Thus far, 134 vendors' representatives from 57 companies have attended the training courses.

## Diamond T Introduces New Low-Priced Model

Delivering at Chicago for a base price of \$1,690, which includes chassis, cab and dual tires, the new Diamond T model 322 (see cut on this page), is available in wheelbase options running from the standard 130 in. to a maximum of 166 in. with standard cab-to-axle dimensions and full length frames



Courtesy of The Autocar, London, England

## SOMETHING FOR THE PEOPLE

Powered by a two-cyl engine developing about 20 hp at 4000 rpm, the new Gutbrod Superior 600 small car, shown above, produced by the Gutbrod company at Plochingen in the American Zone of Germany, has an overall length of 140 in. It is aimed at the mass market, and is designed to be new German people's car.

for bodies up to 14 ft. A special 190-in. wheelbase with one-piece side rails for 48-passenger school buses has been added to the line. The safety steel cab is the same as that for the recently-introduced models 420, 520, and 620, and includes the no-draft, full-vision features with one-piece curved windshield

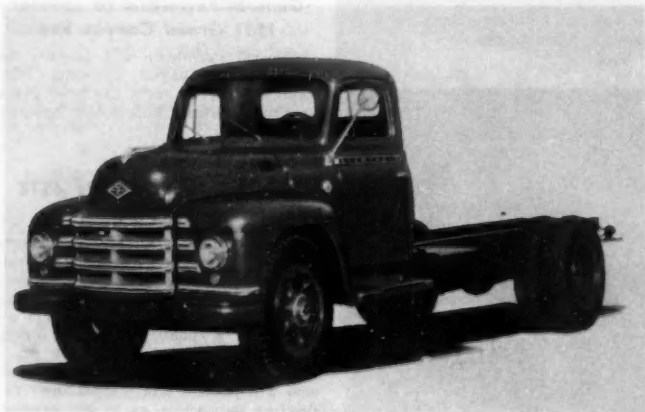
without center post. This cab has a four-point flexible mounting and the Diamond T quick detachable fenders have been incorporated into the new model.

## Continental Developing Solid Fuel Ram Jet

Continental Aviation & Engineering Corp. is developing a ram jet engine for the armed services designed to use solid fuels. The engine, which is the first to be built in this country, is in the testing stage.

## Studebaker Automatic Drive Named Just That

Studebaker, which often does the unexpected, has reversed the trend toward Hollywood superlatives in naming automatic transmissions by simply calling it the Studebaker Automatic Drive. Although more than 200 trick names were submitted for the device, the company decided that simplicity in the name would make it more distinctive. Studebaker is already shipping the automatic drives to dealers on Commodore models only, and the entire dealer body should be sampled by the end of this month. It is expected that it will also be offered on the Champion models in three or four months.



## SMALLER DIAMOND

Rated for 14,500 lb GVW, this new 1½ ton Diamond T model 322, is powered by the improved QXLD engine, developed jointly by Diamond T and Hercules engineers. This engine has a bore and stroke of 3-7/16 in. by 4¼ in., a piston displacement of 236 cu. in., and it develops 91 hp at 3200 rpm.



# News of the AUTOMOTIVE

## Government Units Own 800,000 Vehicles

Federal, state and local government agencies today own more than 530,000 automobiles and trucks or 150,000 more than in 1941, according to the Automobile Manufacturers Association. In addition, nearly 300,000 trucks are owned by the armed forces. All these vehicles are not subject to license fees or gasoline taxes.

## N. Y. Law Requires Use of Turn Signals

The New York legislature has passed a bill requiring installation of electrical directional signals on all motor vehicles manufactured for use in New York State after Jan. 1, 1952. The new bill replaces a measure of last year requiring mechanical directional signals on all new cars sold in that state beginning in 1952. As enacted, the new measure deletes the mechanical designation and authorizes the Motor Vehicle Commissioner to designate the type of signal device to be used.

## New Plants Built Around Interior Layouts

The current trend in building new automotive plants is to lay out an interior plan and erect a shell around it, according to a representative of a large architectural firm. He said that there is some consideration given to the fact that constant improvement in plant layout and building methods may obsolete a plant in as little as 10 years, so that construction costs are held to



## HAULS A HUNDRED

*This giant new British Thornycroft tractor, capable of hauling up to 100 tons, and powered by an eight-cyl Meteorite Diesel engine which develops 250 hp, has a maximum speed of 28 mph. Called the Mighty Antar, the new tractor was built for the Iraq Petroleum Co. The overall length of the tractor is 31 ft, 10 in., its width is 10 ft, 3 in., and the overall length of tractor and the trailer is 110 ft.*

the absolute minimum that will meet the requirements. He points out that in designing plants, the maximum of attention is being given to the element of human comfort. Consequently designers are constantly striving for plants that are cleaner and easier to keep clean and that have a maximum of good lighting and ventilation. Some plants are even going so far as to provide escalators and similar fatigue saving devices, both for convenience and comfort to the employee and for maintaining high efficiency of the worker. The trend is away from multiple-storied buildings and toward the one or two story structure, which has many advantages.

## Reduced Parts Business Cuts Hudson 1949 Net

Reduced parts and accessory business last year cut 1949 earnings of Hudson Motor Car Co. to \$10,111,219, according to A. E. Barit, president. Net income in 1948 was \$13,225,923. Also important in the reduced earnings last year was the high cost of procuring steel during the shortage. Last year Hudson shipped 144,685 cars compared with 142,454 in 1948.

## General Petroleum to Sponsor 1951 Grand Canyon Run

General Petroleum will sponsor the 1951 Grand Canyon Economy Run. Sanction for the event has been given by the American Automobile Association.

## Four Top Economists in ASTE Economic Forum

Sponsored cooperatively by a committee of publishers and the American Society of Tool Engineers in connection with the Industrial Cost-Cutting Exposition opening in Philadelphia on April 10, a public economic forum will include four of the leading practical economists of the United States who will present and discuss their respective viewpoints as to our present economic situation and the outlook for the future. The four are: Dr. Edwin G. Nourse, formerly Chairman of the Council of Economic Advisers to the President and a founder of Brookings Institution; Dr. C. Canby Balderston,



## UNVEILING IN APRIL

*The new 1950 Ashton Martin DB2 2½ litre sports sedan, shown above, will be unveiled for the first time in the world at the British Automobile Show in New York City in April.*



# INDUSTRIES

Dean of the Wharton School of Finance and Commerce and outstanding authority on industrial relations; Edward T. Cheyfitz, labor economist and youngest man ever to be elected to the National Executive Board of the CIO; and Joseph A. Livingston, business economist and formerly economic assistant to the Chief, Office of War Mobilization and Reconversion.

The meeting will be opened by Robert H. Douglas, president, the American Society of Tool Engineers, and president, Godscroft Industries, of Montreal. Paul Wooton, president, the Society of Business Magazine Editors and secretary-treasurer of the White House Correspondents' Association, will introduce the various speakers. Chairman of the Publishers' Committee is Joseph S. Hildreth, president, the Chilton Co., Philadelphia.

## Bell Aircraft Sells Prime Mover Div.

Bell Aircraft Corp. has announced the sale of the business of the firm's Prime Mover Div. to a newly-organized concern at Muscatine, Ia., for an undisclosed price. Bell said that the deal was made in order that it could devote all of its activity to the acceleration of high priority military schedules which had been delayed by the 19-week Bell strike that ended late in October of last year.

## GMC Gets Large Order for Buses from Cuba

GMC Truck & Coach Div. of GM will build an order of 300 buses for a Cuban company located in Havana. The order amounts to more than \$3.5 million, and will consist of half heavy and half light duty vehicles.

## Hallet and Graney Made K-F Vice Presidents

John Hallet, general manager, and Robert Graney, assistant to the president in charge of industrial relations, have been appointed vice-presidents of the Kaiser-Frazer Corp. Both had been associated with Kaiser enterprises before joining the Willow Run organization.

## GM's Rochester Products to Expand

A new building expansion program for GM's Rochester Products Div., has been announced by Thomas L. Lee, general manager. A new building, 400

ft wide by 680 ft long, comprising 272,000 sq ft, will be added on the west side of the present plant, increasing the manufacturing floor space by approximately 60 per cent. It is anticipated that the addition will be completed about the end of the year.

## To Hold Highway Congress in Washington, D. C., in April

The Third Highway Transportation Congress to be held in Washington, D. C., from April 25-27 will have as its theme "Fifty Years of Highway Transportation Progress." The keynote address by N.H.U.C.'s Chairman Albert Bradley, executive vice-president of General Motors, will examine highway transportation's opportunities as it begins a second half century of service to the American public. Other speakers include Lee R. Jackson, president, Firestone Tire and Rubber Co., who will speak on "Highway Transportation of Tomorrow," and Dr. J. O. Christianson, Minnesota civic leader, educator and agriculturist, whose topic will be, "The Roads Americans Travel." During the Congress such problems as adequate planning to meet growing highway and street needs, equitable taxation, protection of highway taxes from diversion to other purposes, toll roads and many other matters will come before the delegates. These will be examined

from the viewpoint of the actual user of the highway, as well as from that of officials and lawmakers.

## Studebaker Net at Record —Expects Drop in 1950

Although profits of the Studebaker Corp. last year broke all previous records, the company is expecting lower earnings this year. Consolidated net profit in 1949 was \$27,563,876, amounting to 5.83 per cent of the sales totaling more than \$473 million. In 1948 earnings were slightly more than \$19 million, representing 4.98 per cent of sales. H. S. Vance, president, told stockholders that industry consensus is that the present production rate cannot be maintained throughout the year, and that 1950 total production will be short of the 1949 record.

## Electric Auto-Lite Net Highest in History

The Electric Auto-Lite Co. last year had the highest earnings in history, according to its annual report. Profit amounted to \$11,328,420 on sales of more than \$218 million. Sales of original equipment to automobile manufacturers amounted to 73 per cent of the total, according to Royce G. Martin, president.



## ARCTIC RESCUER

This large, tandem-rotored all-metal helicopter, said to be the world's first helicopter designed specifically for large scale Arctic rescue work is called the H-21 Arctic Rescue Helicopter, and has been ordered by the U. S. Air Force from the Piasecki Helicopter Corp. Featuring "omnibious" landing gear, the H-21 will be able to land on snow, ice, water, tundra, marsh or land without changing the gear. Powered by the Wright Cyclone R-1820-76A aircooled radial engine, the H-21's fuselage measures 54 ft from nose to tail, and has 44 ft diameter rotors.

# News of the AUTOMOTIVE INDUSTRIES

## Detroit Dealers to Stage Outdoor Car Show

Detroit automobile dealers this summer will stage their first automobile show since before the war. About 200 passenger cars will be on display in connection with the Detroit Auto Dealers Association's golf tournament early in July. It will be the first outdoor automobile show ever held in the industry. The dealers are also planning a regular seasonal automobile show for 1951 models in Detroit next November.

## Briggs 1949 Earnings Hit \$13.3 Million

The Briggs Manufacturing Co. has reported net earnings of \$13,395,568 for 1949 in a preliminary annual report. Earnings in 1948 were in excess of \$10.5 million.

## Ford Supplying Police With Special Cars

Ford is currently doing considerable business supplying special cars for law enforcement agencies. The car is a modified version of the regular Ford,

and is powered by a new 110-hp V-8 special highway control engine. Displacement is 255.4 cu in. and maximum torque is 200 lb-ft at 2000 rpm. Bore and stroke are 3 3/16 in. by 4 in. The regular 100 hp V-8 and 95 hp V-6 are also available for police cars. Other modifications include special heavy duty front and rear seats, vinyl plastic upholstery, oversized generator and regulator assembly, heavy duty battery, and a heavy duty semi-centrifugal 10-in. diameter clutch.

## Ford Turnover Rate Continues Drop

Ford's "human engineering" program appears to be making progress, according to the latest figures. Average monthly turnover among all employees last year dropped to three per cent from 3.7 per cent the preceding year. Ford turnover rate compares with BLS figures of 5.8 per cent for the automobile industry and 4.2 per cent for all manufacturing industries. In Michigan the comparison was even more favorable being 2.9 per cent last year, compared to 8 per cent for the automobile industry and 6.9 per cent for all Michigan manufacturing industries.

## Boeing Developing Turbo-Prop Versions of Transports

The Boeing Airplane Co., Seattle, Wash., has announced that turbine-propeller power plants for both the Boeing Stratocruiser and its military counterpart, the C-97A Stratofreighter, are now under development. The new power plants would make possible greater operating altitude, higher speed, and heavier gross weights for the double-deck transports, according to Boeing. The overall weight of the turbo-prop engine installation would be approximately 25 per cent less than for the present piston-type engines, it was stated.

## Standard of England Forms Canadian Subsidiary

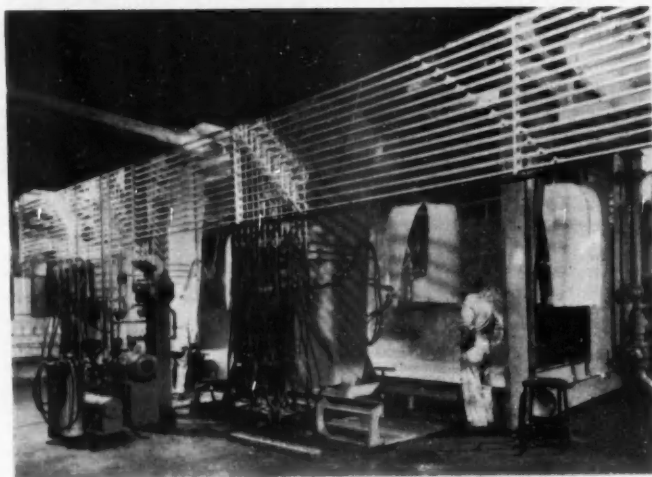
Standard Motor Co., Ltd., of Coventry, England, has formed a Canadian subsidiary to be known as the Standard Motor Co. (Canada) Ltd. Sir John Black, president of the parent company, also heads the Canadian company, and A.C.L. Mills has been appointed Canadian managing-director with headquarters in Toronto.

## Dunlop to Make Aviation Products in Canada

The Dunlop Rubber Co. has announced that it will begin manufacturing its aviation products in Canada soon. J. Wright, general manager of the company's aviation division, said that production of the company's full line of engineering equipment would start at once, while manufacture of aviation tires is planned for the "near future." The actual manufacture will be assigned to Dowty Equipment of Canada Ltd., at its Ajax, Ontario plant. Dunlop technicians from the company's head office in the United Kingdom will supervise the work at first.

## Ford Plans Financing Aid for New Dealers

After a lapse of eight years, Ford has returned to a dealer financing program. The company has set up a newly created dealer development office to provide part of the funds required for capitalization of new Ford and Lincoln-Mercury dealerships. Dealers will start as partial owners and will manage the operations with the objective of becoming sole owners. Director of the new office is Robert L. Nadel, formerly manager of the used car and truck sales department.



## SPEEDY SPRAY

An automatic spray system, in operation at the Nash-Kelvinator Corp. plant in Kenosha, Wisc., is shown in this photograph. After the prime coat has been applied the parts are placed on hooks which are attached to a constant moving conveyor. Upon entering the spray booth, a wheel at the top of the hook contacts a moving belt, spinning the hook approximately 30 rpm. One spray gun is attached to an arm leading to a hydraulic controlled unit which travels with the work for a distance necessary for the gun to spray one coat which is done either by the up or down stroke of the gun. The unit moves back to repeat the same operation on the next rack or hook. Two of these units operate the same, one for the first coat and one for the second coat, about one minute between coats.

# Men in the News

Current Personnel Appointments and Changes at Plants of Automotive Manufacturers and Their Suppliers.

The Torrington Co.—E. K. Brown, formerly Chief Engineer, has been appointed Director of Research for the company. B. T. Virtue will succeed Mr. Brown as Chief Engineer of the Needle Bearings Division at Torrington.

Ford Motor Co.—Robert R. Nadai has been appointed director of the newly-created Dealer Development Office. The appointment of Dennis A. Kuhn as Parts and Accessories manager for the Eastern Division of Lincoln-Mercury Division has been announced.

Republic Rubber Div., Lee Rubber & Tire Corp.—R. W. Deemer has been appointed Production Manager and H. M. Conner, Credit Manager of the Div.

Allen Electric & Equipment Co.—Walter M. Cage has been named as a Sales Engineer with headquarters in Cleveland, Ohio.

American Brakeblok Div., American Brake Shoe Co.—Donald K. Rennie has been appointed Works Manager and James W. Green, Jr., Superintendent of the Winchester, Va., Plant.

The B. F. Goodrich Co.—R. E. Montgomery has been named Manager of original equipment sales on Off-the-Road, Heavy duty truck and all types of industrial tires. Succeeding Mr. Montgomery as Cleveland District Manager is J. D. Roarty.

Airquipment Co.—Ralph J. Osborn has been appointed Sales Manager of the company, a wholly owned subsidiary of Lockheed Aircraft Corp.

The Frederick Post Co.—Thomas L. Coatney has been appointed General Sales Manager, in charge of all sales operations.

The Imperial Brass Mfg. Co.—The election of Frederick C. Shafer as President and Chairman of the Board of Directors of the company, has been announced. C. H. Benson, Sales Manager, Automotive Industrial-Refrigeration Distributor Sales, has been named Vice-President.

Harnischfeger Corp.—The appointment of A. G. Hendrickson as Asst. Sales Manager of the P & H Welding Div., has been announced.

Detroit Automotive Products Corp. (formerly Thorton Tandem Co.)—O. B. Casey has joined the company as National Service Manager.

(Turn to page 62, please)

## Necrology

Dr. Alexander Klemin, 61, technical editor of *Aero Digest*, former head of the Guggenheim School of Aeronautics at New York University, and authority on helicopters died on March 13 in Greenwich, Conn.

C. Lawrence Muench, 56, president, Hood Rubber Co., a division of the B. F. Goodrich Co., died March 6.

## CALENDAR

OF COMING SHOWS AND MEETINGS

### Conventions and Meetings

Nat'l Production Expos., Chicago, Apr. 4-8  
Amer. Inst. Elec. Engrs. Conf. on Elec. Welding, Detroit, Apr. 5-7  
Midwest Power Conference, Chicago, Apr. 5-7  
Amer. Society Lubrication Engineers Convention, Detroit, Apr. 10-11-12  
Amer. Soc. Tool Engineers Industrial Expos., Phila., Apr. 10-14  
Nat'l Petroleum Assoc. Annual Mtg., Cleveland, Apr. 12-14  
Society of Motor Mfrs. & Traders British Auto. & Motorcycle Show, New York City, Apr. 15-23  
SAE Aeronautic & Aircraft Eng. Display, New York City, Apr. 17-19  
Nat'l Packaging Exposition, Chicago, Apr. 24-28  
Metal Powder Assoc. Annual Metal Powder Show, Detroit, Apr. 25-26  
Westinghouse Mech. Tool Electrification Forum, Buffalo, Apr. 25-26  
3rd Highway Transportation Congress, Washington, Apr. 25-27  
Chamber of Commerce of the United States Annual Mtg., Washington, D. C., May 1-3  
International Motor Show, Turin, Italy, May 4-14  
Mid West Automotive Show, Chicago, May 11-14  
Automotive Engine Rebuilders Assoc. Annual Convention, St. Louis, May 18-19  
Soc. for Exper. Stress Analysis, Cleveland, May 25-27  
International Trade Fair, Toronto, May 29-June 9  
Amer. Society for Quality Control, Fifth Midwest Conference-Annual Convention, Milwaukee, Wis., June 1-2  
Amer. Gear Mfrs. Assoc., Hot Springs, Va., June 4-7  
SAE Summer Mtg., French Lick, June 4-9  
Amer. Electroplaters' Soc. Convention, Boston, June 12-16  
Amer. Soc. Mech. Engineers, Nat'l Mtg., Chicago, June 12-16  
A.S.T.M. Annual Mtg., Atlantic City, June 26-30  
International Trade Fair, Chicago, Aug. 7-10  
SAE Nat'l West Coast Mtg., Los Angeles, Aug. 14-16  
SAE Tractor Mtg., Milwaukee, Sept. 11  
Nat'l Assoc. Motor Bus Operators Annual Mtg., Chicago, Sept. 15-16  
Instrument Soc. of Amer. Conf. & Exhibit, Buffalo, Sept. 18-22  
SAE Nat'l Transportation Mtg., New York City, Oct. 16-18  
Nat'l Safety Congress, Chicago, Oct. 16-20  
Amer. Society for Metals' Annual Nat'l Metal Congress & Exhibition, Chicago, Oct. 23-27  
Amer. Welding Soc. Annual Mtg., Chicago, Oct. 27-29  
Nat'l Lub. Grease Inst., Chicago, Oct. 29-Nov. 1

Lincoln-Mercury Div., Ford Motor Co.—William A. Maharry has been made Asst. Manager of Public Relations for the division.

Hudson Motor Car Co.—The appointment of Lew Sumpter as a special representative for the company has been announced.

White Motor Co.—The appointment of Lee H. Lundy as Philadelphia Manager has been announced.

Mack Motor Truck Co.—W. E. McLean has been elected Vice-President and Sales Manager of the company's New England Div.

Mack Truck, Inc.—E. G. Ewell, Vice-President of Mack-International Motor Truck Corp., has been named General Sales Manager of the Eastern, Atlantic and Southern Sales Divs.

Continental Motors Corp.—The appointment of Raymond J. Fencil as Service Manager of the Aircraft Engine Div., has been announced. Mr. Fencil succeeds A. Vandenberg, resigned.

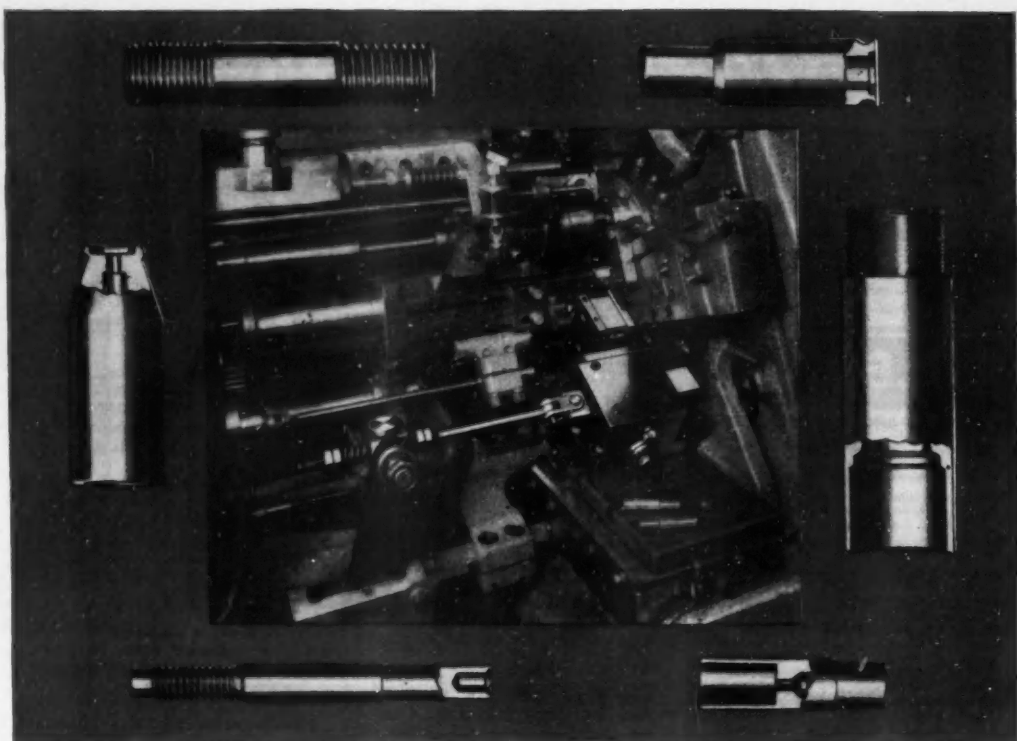
E. I. duPont de Nemours & Co., Inc.—Announcement has been made of the creation of a new department to handle research, production and sales for all products now handled by the Cellophane Div. of the Rayon Dept. The new department will have as its General Manager, Donald F. Carpenter.

Allegheny Ludlum Steel Corp.—Roy D. Haworth, Jr., has been made manager of product development of the Carbide Alloys Div.

Aluminum Company of America—A. H. Schmeltz has been named Manager of the newly-established Patent Department.

General Tire & Rubber Co.—The appointment of E. W. Lutz as Credit Manager, has been made.

Pratt & Whitney—Joseph G. Grady has been appointed to the position of District Sales Manager for Small Tools and Gages in the New York territory, succeeding J. C. Molinar, who has become Sales Manager of Small Tools and Gages.



## FINISH THIS DOUBLE OPERATION WORK ***Faster!***

With the New National Acme Pick-Up and Transfer Attachment

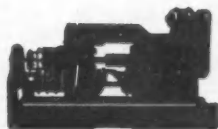
Here's a way to save machines, manpower and money.

The new National Acme Swinging Type Pick-Up and Transfer Attachment permits doing many second operation jobs on a first operation machine. *Think what that means:* fewer handlings, fewer machines, faster production—and less overhead, less floor space.

This special attachment—another example of how modern Acme-Gridley tooling methods give "*more good pieces in the pan*"—is available only as original equipment on bar machines of  $\frac{9}{16}$ ", 1" and  $1\frac{1}{4}$ " capacities.

With this new attachment you can finish both ends of a part in one double-indexing set-up. For example, the stud illustrated is completed in 9 seconds flat.

For additional examples of time-saving Acme-Gridley tooling methods, write for our new Bulletin TP-44.

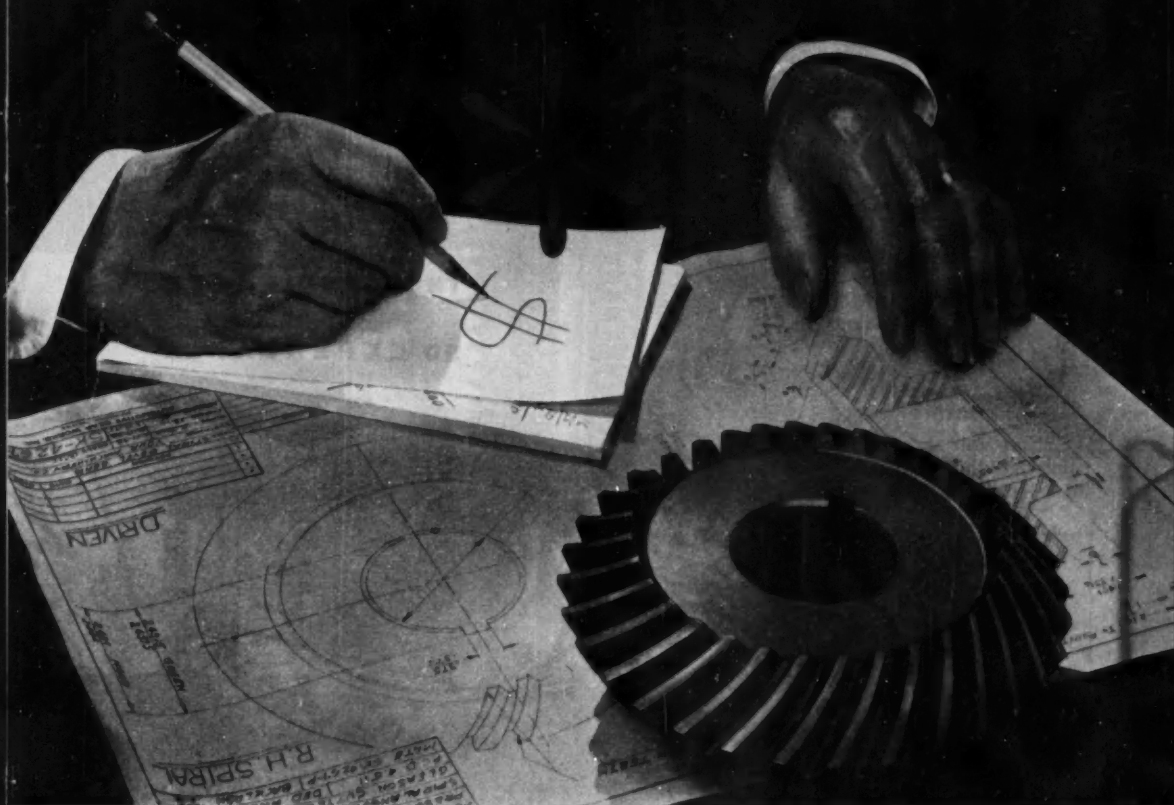


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built in 4, 6 and 8 spindle  
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## \* What do you mean — "How much?"

**You're** buying gears. You naturally want to know "How much?"

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**How much** they will cost per unit on delivery? That's *one* important consideration, but not the only one by any means.

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**How much** will they reflect the experience, integrity, and skill of their makers?

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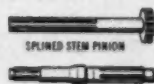
STRAIGHT BEVEL



STRAIGHT SPUR



HELICAL SPUR



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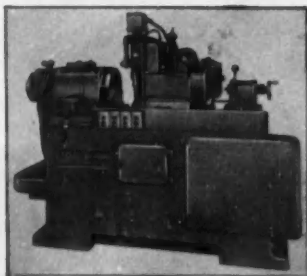
(Advertisement)

## Hanson-Whitney Thread Grinder features

Easier . . . Faster . . . More  
Wheel Dressings

Hanson-Whitney extends an invitation to you to see its new semi-automatic Thread Grinder at work. It is impossible, in restricted space, to explain the importance of this engineering achievement . . . to provide the necessary close-up photographs that bring out the many design innovations . . . nor can we show you the accuracy, the speed, the quality of production.

But we can arrange an appointment that we believe will interest anyone who needs a



STREAMLINED, COMPACT  
HANSON-WHITNEY THREAD GRINDER

better, faster method for grinding external threads from the solid on a production basis.

You will see a Master Roll that re-trues the Grinding Wheel for re-grinding the Crusher Roll in position, whenever its pattern has been worn by repeated crushing of the wheel. This means uninterrupted production for a long time . . . until the original Master Roll thread pattern itself becomes worn.

This is but one valuable feature of the new Thread Grinder. There are many more which combine to step up machine performance, lower operator fatigue, reduce rejects, and greatly improve the work.

If you are interested in rapid production thread grinding, we ask you to write us.



It seems to be a foregone conclusion in many plants that taps in the screw machine sizes are *expected* to break . . . and *expected* to wear out . . . quickly.

Well, there's a big difference in taps and also in the meaning of "quickly."

Here at Hanson-Whitney we know that taps are expendable to a degree . . . but the degree depends upon many factors such as tap selection, type of operation, work material and lubrication.

If you are having troubles with tap breakage and tap wear we suggest that you do two things, 1) Write for our engineering suggestions, 2) Specify Hanson-Whitney taps . . . finished after hardening. There are no finer taps made.

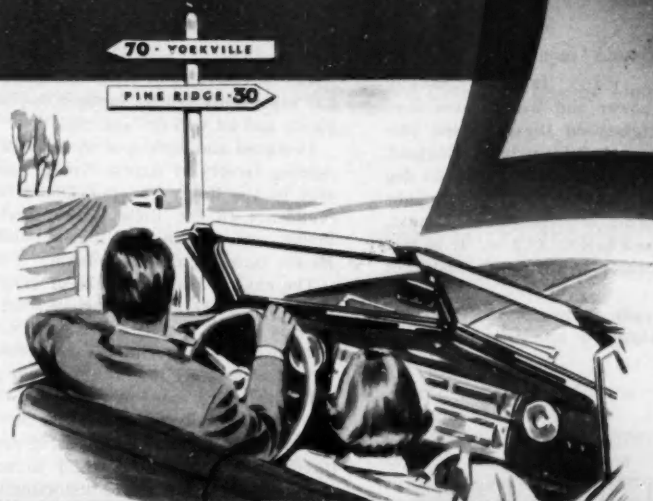
HANSON-WHITNEY MACHINE CO. HARTFORD 2, CONN.  
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# Hanson Whitney

For practical recommendations submit your problems to Hanson-Whitney engineers.

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One of Borg-Warner's great contributions to the automotive industry and America's car owners is the B-W Automatic Overdrive. When it is engaged, every mile driven is restful, relaxed—free from fatiguing engine vibration and noise. And out of every 70 Overdrive miles enough gas is saved to stretch the distance 30 miles further.

That's because the B-W Overdrive cuts engine revolutions 30% at speeds above 26 miles per hour. At 50, for

instance, a car's engine is lazying along at 35. That means less engine wear, too—longer life and fewer repair bills.

The Automatic Overdrive is a development and product of B-W's Warner Gear Division. It is typical of the advanced engineering and precision production with which Borg-Warner daily serves the automotive industry ... and America.

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*Engineering makes it work*

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*Production makes it available*



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# New Diesel Engine

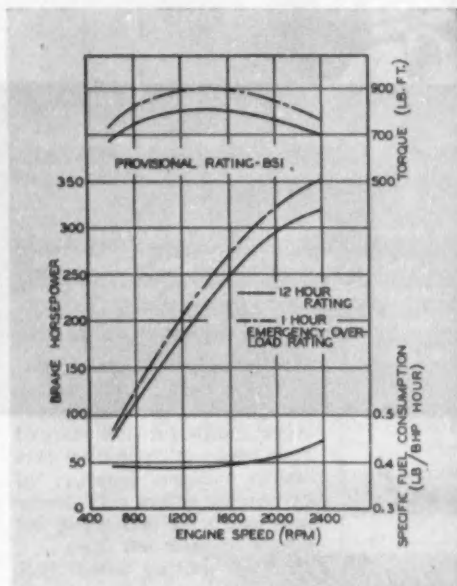
**N**EW standards for power and weight have been set by the Meteorite high-speed Diesel engine produced by the Rover Co., of Birmingham, England. With a piston displacement of 1099 cu in. this 60 deg V-eight develops 320 hp at 2400 rpm and weighs 1500 lb complete. Its external dimensions are: Length, 44 in.; width, 31.7 in.; and height, 41.2 in. It is said to have the most favorable power-weight ratio of any Diesel yet built.

The Meteorite is already in production, the first engines having been installed in special vehicles used

by an oil company in Iraq. Its main applications are for heavy duty trucks, locomotives, boats, generating plants and oil well drilling rigs.

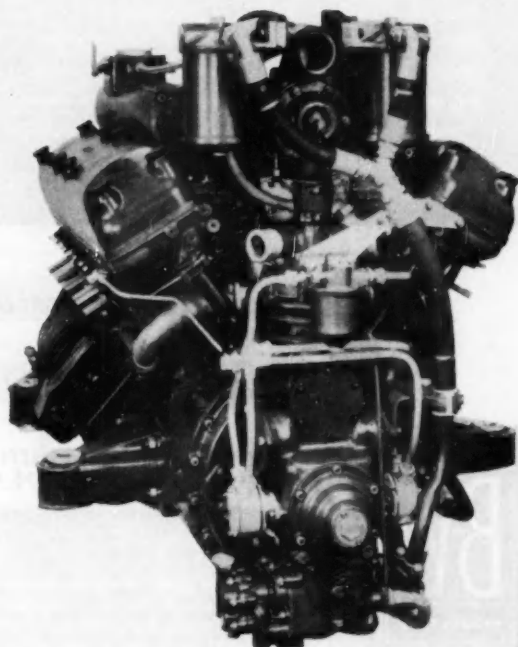
Designed and developed by the Ministry of Supply Agency factory at Acocks Green, managed and operated by the Rover Co., this Diesel has a certain resemblance to the Rolls Royce Merlin produced by Rover, and to the 12-cylinder gasoline and Diesel Meteor tank engines built during World War II.

The engine has two banks of cylinders at 60 deg, with two intake and one exhaust valve per cylinder. Bore is 5.4 in., stroke 6.0 in., and compression ratio 16.5 to one. The cylinders are fitted with wet-type forged alloy steel liners, chromium plated to resist wear in the fire zone. A feature of the liners is that they are unusually thin, the advantage of this, according to the designers, being that, if properly manufactured, they are not too rigid to accommodate the pistons under conditions of distortion which may occur with rapidly changing temperatures. This has been borne out by the remarkably good bearing of the



(Above) Torque and horsepower ratings of the Meteorite Diesel.

(Right) Accessories are mounted at the front of the engine as shown in this view.



# Weights Under 5 Lb/Hp

*Rover Meteorite Features Compact V-8  
Design and Extensive Use of Light Alloys*

**By W. F. Bradley**

*Special European Correspondent of  
AUTOMOTIVE INDUSTRIES*

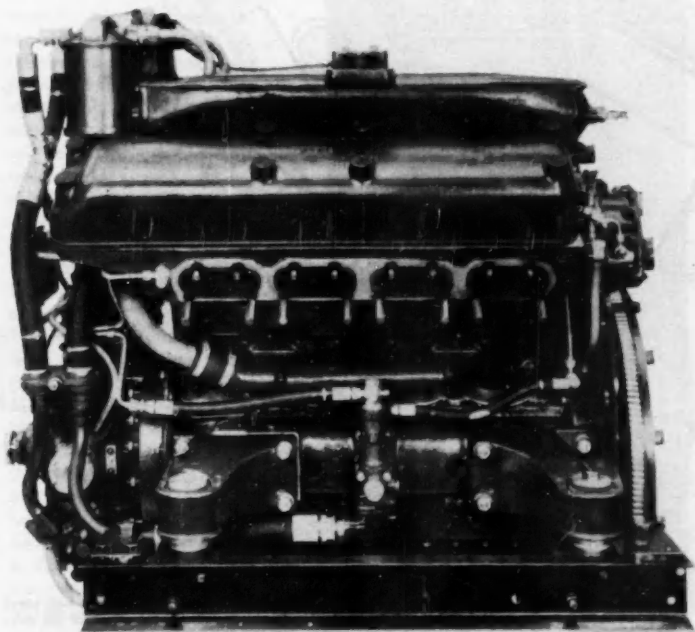
pistons in these engines and their freedom from seizure despite small clearances and extreme load conditions to which they were subjected during the early research work. The aluminum alloy cylinder blocks are not subjected to tensile load through combustion pressures. This is achieved by long studs passing through the blocks and cylinder heads, which carry all combustion loads and transmit them to the heavily ribbed diaphragms supporting the main bearings in the crankcase.

The crankcase is made of aluminum alloy which conforms to British Air Ministry Material Specification D.T.D. 135, as employed on Rolls Royce Merlin aircraft engines. This has an ultimate tensile strength of 23,500 psi.

Light alloy is used for the cylinder heads—one for each bank of four cylinders. A feature of this layout is the use of a longitudinal baffle, practically the whole length of the cylinder head and at an intermediate level between the main combustion chamber walls and the upper deck. This has the effect of controlling the flow of water and had previously been tried out with

great success on one-piece, six-cylinder heads.

Spun cast iron and phosphor bronze valve guides are used for the inlet and exhaust valves, respectively. The exhaust valves and seats are austenitic steel, the diameter being two in. The sodium cooled exhaust valves are Stellite tipped and Brightway seated. Silchrome is used for the inlet valve seats. Valve seats are screwed and shrunk into the heads, and to assure easy fitting and removal valve guides are tapered on their outside diameter. Pistons are adonized die cast aluminum-silicon alloy. There are three compression and three oil rings per piston.



*Left side view of the engine.*

## New Diesel Weighs Under 5 Lb/Hp

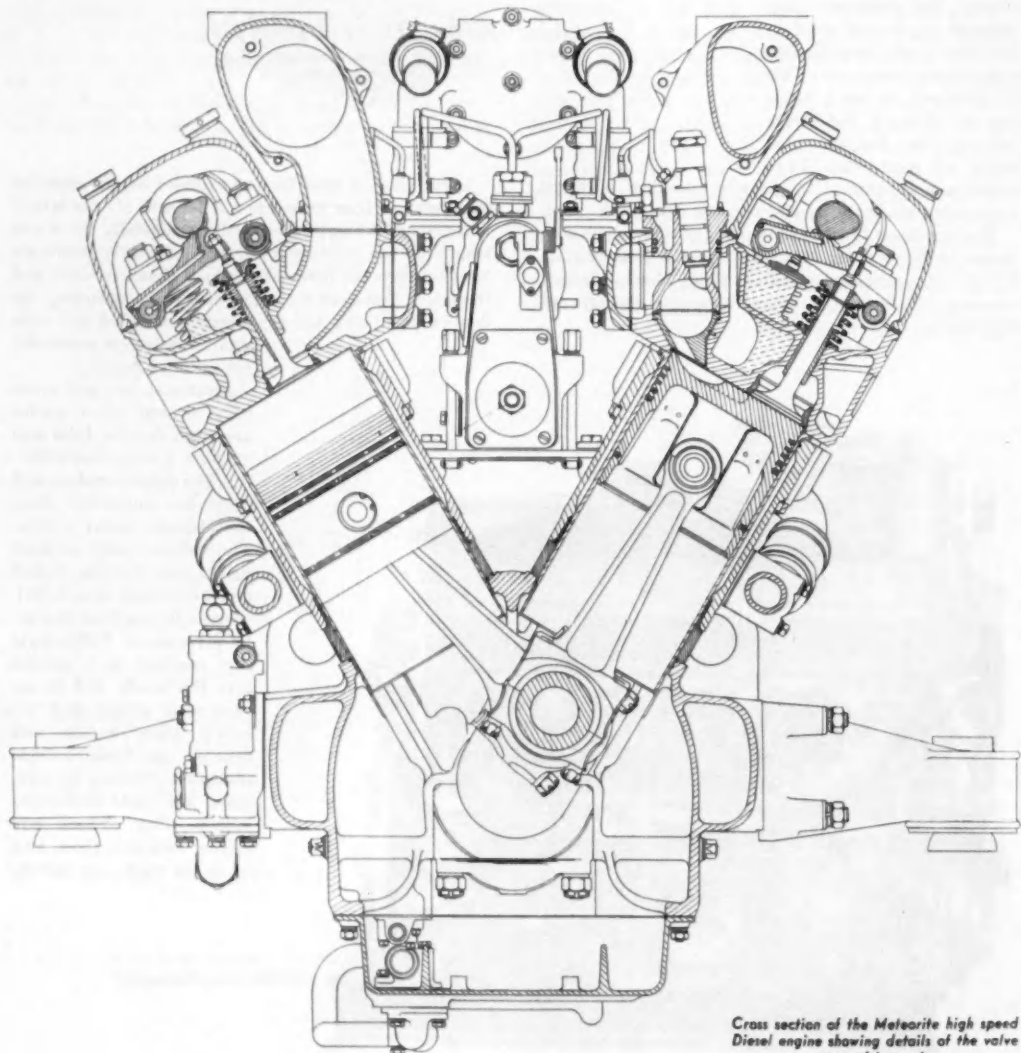
The crankshaft is a nitrided chrome molybdenum steel forging, machined all over, with integral balance weights. It is fitted with a Lanchester type torsional vibration damper. The five main bearings are of the steel-backed lead-tin plated type. A remarkably stiff

structure is achieved by transverse bolts passing through the main bearing caps and also by longitudinal box section beams which minimize any transverse deflections which might affect bearing alignment.

The connecting rods, which are machined all over and shot peened, are forked and plain type, the forked rods being fitted to the right-hand bank and the plain rods to the left-hand bank. They have lead-bronze bearings, with a tin-lead flash, and are carried in thin steel shells.

While the combustion chamber is of the Ricardo Comet type, incorporating a hot plug, Rover engineers have carried the Ricardo experiments a little further

*(Turn to page 80, please)*



*Cross section of the Meteorite high speed Diesel engine showing details of the valve gear, pistons, etc.*



# Mechanical Changes in Canadian Nash

**S**UPPLEMENTING a recent news report, the following provides a description of the Nash Airflyte, the first Nash-built Canadian car, which will be in production soon in the new plant of Nash Motors of Canada, Ltd., in Toronto. The line will be offered in two body styles—a four-door sedan and two-door sedan. From the standpoint of styling, wheelbase, and overall size and dimensions this car will look exactly the same on the road as the Statesman, its U. S. counterpart.

From the standpoint of mechanical detail, on the other hand, it represents some interesting variations from the familiar Nash pattern, stemming from the emphasis upon the utilization of Canadian parts and units to a great extent.

So far as the body is concerned, the car is typically of unitized Airflyte construction, the major body panels and structural parts being shipped knocked down to Toronto where they are welded into an integral structure by methods developed in the Nash body plant. Interior trim treatment and materials, however, are Canadian content and made to suit Canadian tastes. Although neither overdrive nor radio will be offered at the start of production, the car will be available with the Nash Weather Eye system at extra cost.

Coming to mechanical details, it is of interest that the engine is the same as for the Nash Statesman built in the U. S. It is supplied as an assembly from the Nash plant at Kenosha but shipped without accessories or electrical equipment. These items include a Canadian Carter carburetor and an AC fuel pump; while all of the electrical equipment including spark

plugs is supplied by Electric Auto-Lite.

Although the clutch is of Borg & Beck make the same as on the U. S.-built cars, the transmission—of three-speed synchromesh type—is supplied by McKinnon Industries.

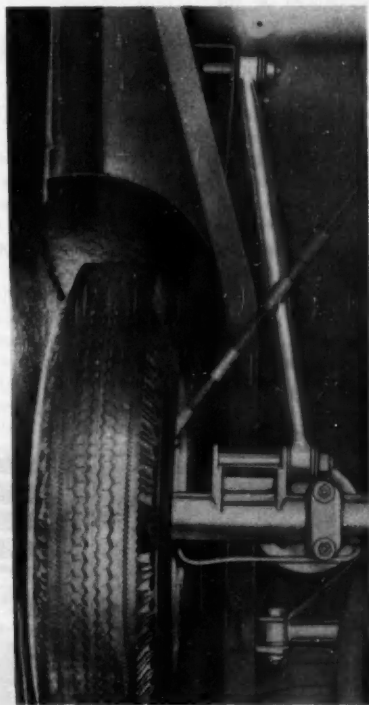
The front suspension is interchangeable with the U. S.-built Statesman, but the arrangement at the rear is different and entirely Canadian. The basic change is in the adoption of the modified torque tube drive incorporated in the rear axle and torque tube assembly supplied by McKinnon Industries of Canada. It has a slip joint at the transmission end with torque taken by the torque tube.

However, because of the different torque tube in combination with coil springs at the rear, the Canadian chassis incorporates a pair of radius rods—from the spring pad to the frame—one on each side. This setup is supplemented by a track bar one of which may be seen directly back of the rear axle in the illustration.

Since the McKinnon rear axle assembly carries 11-in. brake drums as standard equipment, 11-in. drums also are mounted at the front wheels. With  $1\frac{3}{4}$  in. linings all around and a lining length of  $20\frac{5}{8}$  in. per wheel, this car provides a lining area of 149 sq in. as compared with 132 sq in. for the Statesman.

A Gemmer steering gear of worm- and two-tooth roller type with ratio of 20 to 1 is standard on this model.

Estimated weight of the Canadian model has increased to approximately 3040 lb for the four-door sedan as compared with around 2965 for the Statesman.



*Closeup showing details of the mounting of rear axle radius arms and track bar.*

# NEW Four-Cylinder Willys Unit Develops 72 Hp. Improved Six Has Larger Bore, Higher Compression, and More Power. Most Models Are Restyled and Half-Tonner Replaces Previous ¾-Ton Unit. Universal Jeeps and Model 463 Four-Wheel Drive Station Wagon Are Continued Without Change In Styling Or Power Plants.

**W**ITH the introduction of its 1950 line, Willys-Overland Motors, Inc., offers some noteworthy developments in styling and mechanical specifications, including two new engines of higher compression ratio and increased performance added to the line. What makes the engine announcement of unique interest is that one of the models is of four-cylinder F-head type which marks the first example of an F-head engine to be placed in production in the U. S. currently, and the only F-head in the U. S. A. since this type of design was discontinued by Hudson.

As a matter of historic interest, Hudson confirms that the F-head engine was first introduced on the Essex in 1919 and continued until 1923. Then the F-head was introduced on the Hudson Super-Six engine for the 1928 model year and continued through the 1929 season. At the present time F-head engines are in regular production in England on Rolls-Royce and Rover engines. From the standpoint of product Willys offers the following restyled models for 1950:

Jeepster (standard model) with F-head, four-cyl engine and without overdrive.

Jeepster Custom with six-cyl engine, including radio, heater and deluxe accessories as standard equipment.

Station Wagon—models with four-cyl F-head engine; and six-cyl engine.

One-ton, four-wheel drive truck with four-cyl F-head engine.

Half-tonner with two-wheel drive equipped with four-cyl F-head engine.

The Half-tonner replaces the previous ¾-ton model which is discontinued as of 1950. It is important to note that the Universal Jeeps as well as the 4 x 463,

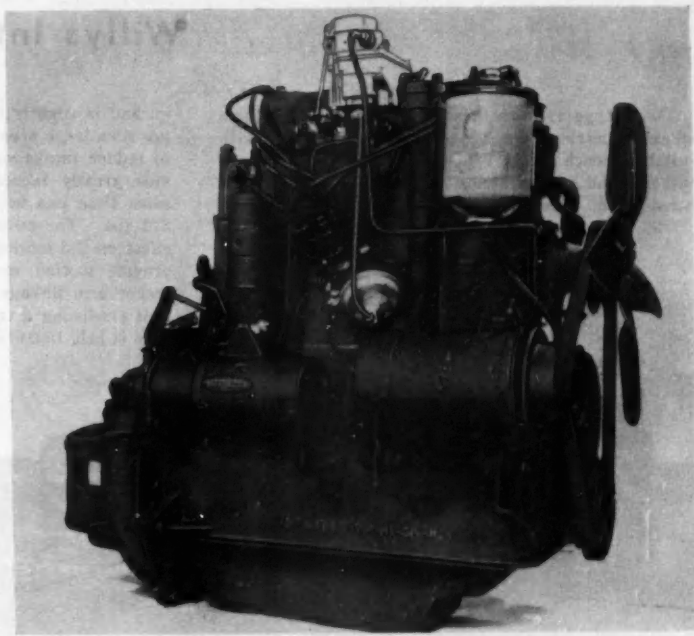
## Willys

four-wheel drive station wagon models are continued for the present without any change in styling or powerplants. These models, therefore, remain exactly the same as in 1949. Thus the Jeepster, standard Station Wagon, panel delivery, and the one-ton



*Restyled Jeepsters for 1950 feature new front grille, new bumper, and sheet metal treatment. These models also are equipped with finger tip manual top operation.*

Right hand side view of F-head, four-cyl engine, showing arrangement of major accessories.



By  
Joseph  
Geschelin

# Introduces F-Head Engine

and half-tonner models are specifically treated with the "new look" appearance changes and are equipped with new powerplants.

Let us consider the two engines first since their conception connotes some extremely interesting features of engineering economy and noteworthy planning. Specifically on the four-cylinder engine the problem was one of developing a radical kind of design answer with the minimum of investment in new tooling and machinery. Too, it was necessary to take into account the fact that certain models noted above would continue using the older type of engines, together with the fact that the military jeeps—which will constitute a sizable percentage of production from now on—will use the older version of the four-cylinder engine. Superimposed on these requirements was the problem of offering satisfactory service, at a price, on the more than 1.1 million Willys engines now in service all over the world.

The solution is a brilliant one, in the opinion of the writer. The F-head engine, to be described here, is basically the same in most respects as the original four-cylinder engine, except for the introduction of the new head and its valve train. Cylinder block, rods, pistons, crankshaft and other parts remain interchangeable. The only change below the head comes in the use of a new camshaft to introduce a new set

of cams for the intake valves. Exhaust valve cams remain unchanged.

Although the exhaust valves remain the same in basic design and in timing, the shift to relatively high compression ratio made it desirable to provide added protection through use of "free" type exhaust valve rotators and hard facing of the exhaust valves.

## Major Specifications Willys-Overland Engines

Type	L-Head	F-Head	L-Head
No. Cyl.....	4	4	6
Bore (in.).....	3½	3½	3½
Stroke (in.).....	4½	4½	3½
Displacement (cu in.).....	134.2	134.2	180
Compression Ratio			
Standard.....	6.48	7.4	7.1
Export.....		6.9	
High Alt.....		7.8	
Hhp (max).....	63 @ 4000	72 @ 4000	75 @ 4000
Torque (lb ft) (Av.).....	105 @ 2000	114 @ 2000	125 @ 2000
No. Main Bearings.....	3	3	4

## Willys Introduces F-Head

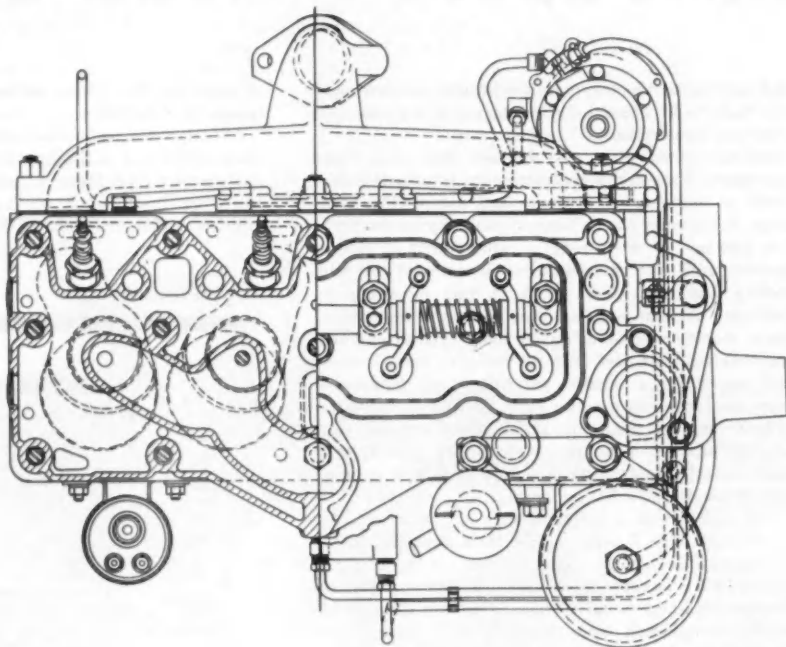
The F-type cylinder head, as illustrated, features an asymmetric form of combustion chamber with suitable quench area. The spark plug is inclined from one side and located almost immediately over the exhaust valve. The intake valve has a diameter of two

in. and is slightly inclined to the vertical axis. Having such large area at the intake port, it was feasible to reduce intake valve lift to 0.260 in. but still provide greatly increased breathing capacity. At the same time gas velocity is reduced from 311 fps to 274 fps. The reduction in valve lift has a salutary effect on the intake valve train since it is possible to provide motion multiplication of 1.29 to 1 in the rocker arm linkage with relatively small light parts, thus producing a rigid and quiet action. Valve clearance is held to 0.018 in.

The F-head engine is offered with three optional compression ratios—for export, 6.9; standard, 7.4; for high altitude operation, 7.8. It will give satisfactory operation on regular grades of fuels of 75-octane rating. It is claimed that the F-head design is



Side view of one of the 1950 Station Wagons, featuring the new front end treatment, new sheet metal, and the restyled opening over the rear wheel housing.



Partly cutaway view of the new F-type cylinder head showing intake passages, rocker arms and shaft, etc.

## Engine

singularly free from detonation and is not carbon-conscious.

Compared with the four-cylinder, L-head engine the F-head model gives increased torque and greatly increased horsepower over a wider range (see specification table). The gain in fuel economy may be gaged from the fact that the L-head engine consumes about 0.575 lb/bhp hr while the F-head consumes only 0.49 lb/bhp hr. This is even more significant at around 85 per cent load where the F-head shows an increase of 25 per cent in fuel economy.

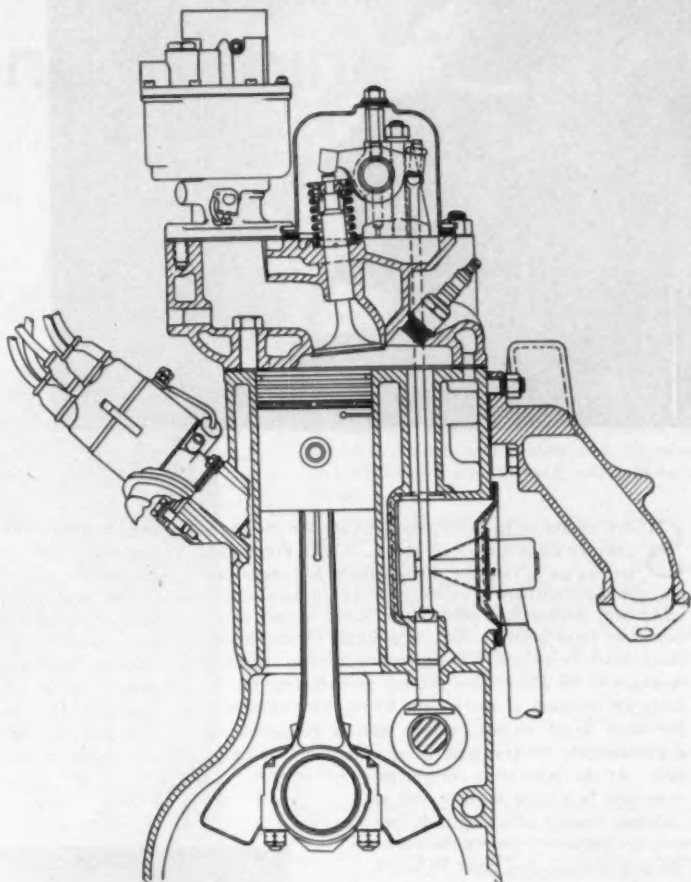
One of the major features of F-head design is that intake manifold passages are cast within the head in "glove-fashion" as shown on the drawing, the carburetor being mounted directly onto the head. This is said to give excellent mixture distribution since the difference in the length of passages from the shortest to the longest is quite small. In addition, the intake passages are completely heated by means of the water jacketing and thus are effectively heated throughout the range of operation. In fact, Willys claims a definite gain in volumetric efficiency because of the elimination of hot spot heating.

Special pains have been taken to prevent oil leakage down the intake valve by introducing a rubber gland and hood over the spring valve.

Pressure lubrication to the rocker arm mechanism is provided by oil lines leading directly from the camshaft bearings. Oil is introduced to the rocker arms through two small holes drilled in the forging, one on each side of the bearing.

It may be noted at this point that the only major outlay of new machinery and tooling for launching the F-head engine is found in the machine line for producing the cylinder head.

Getting increased performance out of the six-cylinder engine was a much simpler problem. Here it was



Sectional view of the F-type cylinder head and upper part of the four-cyl engine. Note that the cylinder block, pistons, rods, and other parts remain interchangeable with the original four-cyl engine exhaust valves and camshaft are changed as explained in text.

a matter, primarily, of increasing displacement and this was accomplished by making the cylinder bores  $\frac{1}{8}$  in. larger. Since the stroke remains the same, all of the component parts remain unchanged except for pistons and rings. On the other hand, in seeking the best solution without adding to cost or equipment, it was found feasible to retain the same cylinder head as on the earlier version. With head and gasket unchanged, they came up with a compression ratio of 7.1 to 1. Since this is below the value considered critical by Willys engineers, no change was made in the exhaust valves. It was not found necessary to use valve rotators or to employ hard-facing as in the case

(Turn to page 62, please)





# Making for Newest

Close-up of the work station of the enormous Taylor-Winfield butt-welding machine designed for joining the turbine wheel to the alloy steel shaft. Butt-welding requires a current draw of 60,000 amp, the parts being drawn together hydraulically with a pressure of 240,000 lbs.

SINCE assuming the sole responsibility for the engineering development of the U. S. Air Force J33 jet engine in October, 1945, Allison has made important contributions to increased power, greater durability and higher fuel economy. Rated thrust is in excess of 4600 lb (dry), and with water/alcohol injection—5400 lb thrust. Compared with the original versions of the J33 engine, present performance represents an increase of more than 50 per cent in thrust for each lb of engine weight and a reduction of approximately 10 per cent in specific fuel consumption. At the same time certain refinements in design have served to increase engine life over 300 per cent as gaged by the extension of the qualification test from 50 hours to 300 hours and a maximum permissible overhaul life of 500 hours.

Most of the improvement in performance can be credited largely to the redesign of two major elements—the compressor diffuser and the compressor rotor. In addition, new combustion chambers now in production have increased life many times as compared with the original version. Design of the diffuser also has been improved by a unique method of casting-in steel leading edge blades as inserts in a location where the gas stream velocity is

nearly 1000 mph. The steel blades are subject to better control of size, form and material and have longer life.

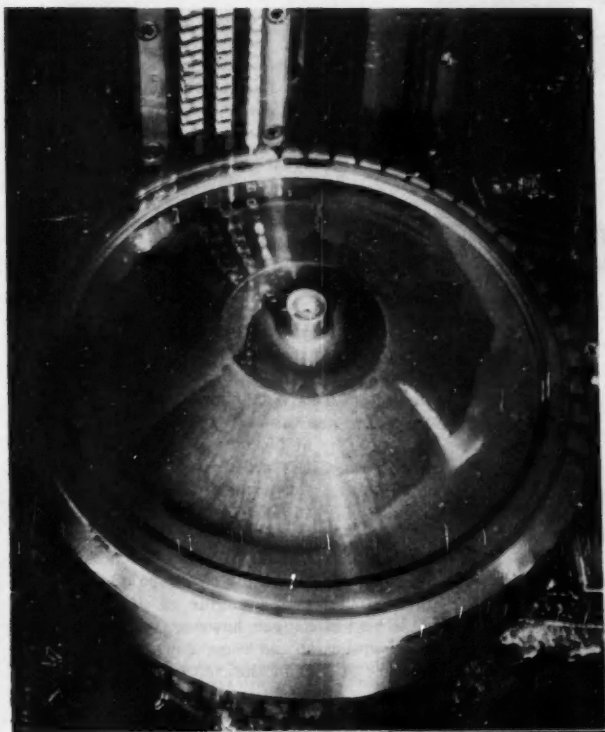
The object of this brief study is to examine the newly designed turbine wheel and compressor rotor and comment on some of the unique manufacturing methods employed in the making of these parts. It may be noted at this point that since performance and durability are more important in a military engine than is manufacturing cost, the emphasis is upon design features rather than production short-cuts. Never-



This is one of the latest type Cincinnati mills designed specifically for milling the new single-stage compressor rotor for the 400 Allison turbo-jet engine. This view shows the second milling machine operation—finishing of vanes to size and form, using a special three-tooth milling cutter.

# Rotors and Turbine Wheels

## Allison 400 Jet Engine



theless, production economy is stressed by the manufacturing department and every effort made to reduce cost wherever feasible. To this end Allison has installed machinery of the most advanced type and is taking advantage of the latest techniques such as the use of cemented-carbide tools and the selection of special cutting fluids for difficult operations.

The turbine wheel—easily one of the heaviest elements of the 400 engine—starts as a special heat-resistant alloy drop forging, later butt-welded to an alloy steel shaft. As redesigned its weight was reduced 55 lb by reducing the thickness of the web and making a change in profile. In addition, the rim

(Turn to page 76, please)

View of work-table of one of two big American vertical surface broaching machines illustrates the technique described in the text. The wheel and shaft assembly is mounted in the fixture, initially, with two grooves prepared on the horizontal American broach so lined up that the deeper groove is presented to the right hand tool while the shallow cut lines up with the center tool. The left hand tool simultaneously cuts a shallow groove in preparation for the next indexing. Tool life is quite satisfactory using Sul-Tran cutting fluid.

Here is one of the two-station special Sundstrand milling machines on the new compressor rotor for the 400 turbo-jet engine. The station in the rear does the angular milling of the lower edges of each vane while the station at the right does a side milling operation to determine the front and rear of part of assembly.





Rover car equipped with a rear mounted gas turbine.

## Facts About the

# Rover Gas Turbine Car

By W. F. Bradley

Special European Correspondent for  
AUTOMOTIVE INDUSTRIES

LONDON, ENGLAND

THE world's first gas turbine automobile has been presented for public test and examination by the Rover Co., of Birmingham, England, on the Proving Ground at Nuneaton, Warwickshire. Research dates back to 1940, when the Rover Co. collaborated with Commodore Whittle, and after various changes was continued at Birmingham with the object of applying experience gained in the war to an engine suitable for road vehicles. The unit tested by the Royal Automobile Club was fitted in a standard Rover 75 passenger car, with slight modification to provide for a rear instead of a front-end mounting.

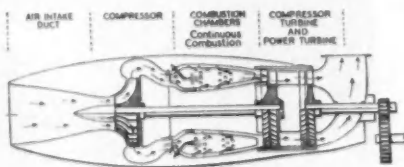
There are two combustion chambers in the power plant, fed with air by a centrifugal compressor with a fully shrouded impeller. Gas from one of the chambers drives the compressor-turbine and is then ducted to the second turbine, the power unit, which is independent of the first turbine. Gas from the second chamber is led

to the power turbine, the shaft of which carries a single helical reduction gear. Final drive is by a short propeller shaft to an offset differential. There is no mechanical connection between the two turbines. Figures on power output are vague. An earlier turbine-engine developed 100 hp at 55,000 rpm. The present one gives higher power, it is stated, at lower speed.

The engine has no heat exchanger, although it was designed to include one. Difficulties of housing a heat exchanger in a passenger car chassis are mainly responsible for its absence. In its present condition kerosene consumption is practically twice the quantity of fuel required for a piston engine of equivalent power. With the heat exchanger, however, the gas turbine's fuel consumption should come down to within reasonable distance of that of the conventional piston engine.

In producing this engine the Rover Co. has had the assistance of the Lucas Co. for work on the combustion system. Turbine blade material is Nimonic, produced by Henry Wiggin & Co., Ltd.

It is definitely stated by the Rover engineers that this first automobile is merely a test setup and that three or four years are likely to elapse before  
(Turn to page 86, please)



Schematic longitudinal sectional view of the Rover's power plant. Courtesy The Autocar. (London).

# Fisher Converts

## to All-Metal Station Wagon Bodies

**F**ISHER Body Division of General Motors has converted its station wagon body production from the wood types to Unisteel body and turret top construction. The Fisher plant at Euclid, O., is assembling the all-steel station wagon bodies for Chevrolet, Pontiac, and Oldsmobile, and also is producing sedan delivery bodies for Chevrolet and Pontiac. Current production is approximately 200 bodies daily in the Euclid plant which employs approximately 1200.

In converting to the Unisteel station wagon body, Fisher Body has achieved the effect of a hardwood grain with decals that transfer wood grain pattern to the metal. The transfer is said to simulate wood to a greater degree than has heretofore been attained.



**(1)** All-metal station wagon bodies, complete even to sun visors and rear view mirror, are shipped from the Fisher Body Plant at Euclid, Ohio, to GM assembly plants throughout the country.

**(2)** Metal doors for the new all-metal station wagon body are stamped at the Fisher Body stamping plant at Cleveland, O. The employee at the right has his hands raised to the palm-button safety controls which operate the press he faces, while the worker at the left stamps a hole in a door inner panel. Door panels then are hung on the moving conveyor as shown at the left of the illustration.

**(3)** Individual body stampings are mounted on a jig where they are welded together to form the body shell. Operators in this illustration are welding metal sections necessary for completion of the all-steel body.



# 80 Oldsmobiles

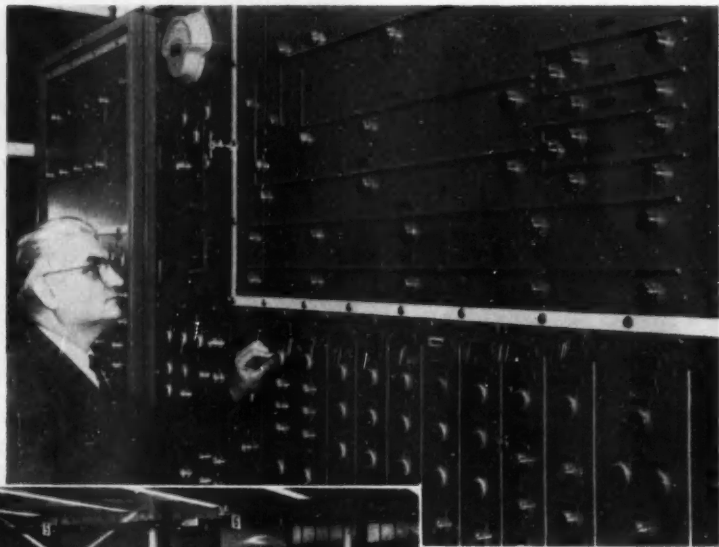
**C**OMPLEMENTING the highly mechanized Rocket engine plant with its impressive array of modern transfer machines, Oldsmobile placed in operation in December, 1949, what is, doubtless, one of the most advanced car assembly plants to be found in the industry. By coincidence the building used for this purpose made Navy rockets during the war. Boasting 500,000 sq ft of productive floor space, it is timed to produce 80 cars an hour, and represents an investment of around \$3.5 million for equipment and installation.

Mechanization and conveyorization designed to eliminate practically all manual handling of parts and cars have been developed to an amazing degree. Even the transfer of chassis and cars from one line to another is accomplished with cross transfer conveyor sections to eliminate hoisting and manual transfer. At various points are some simple but effective means for automatically transferring parts from one con-

veyor to another and from feeder monorails to the final assembly line.

Since the assembly building is isolated from manufacturing departments, an extensive system of conveyors is employed for delivering major units such as bodies, axles, front suspension assemblies, engines, etc., directly into the assembly building, then to preparation lines and final assembly.

Completed bodies as delivered by the Lansing Fisher



(Above)

*This is the master control board which registers the operation of every conveyor line in the plant. Signal lights are off when lines are operating normally but a light flashes indicating the location of any stoppage.*

(Left)

*General view of test station at end of final assembly line, showing automatic cross transfer of cars by the floor-level conveyor at the right. On the left a car is being given its final test on a test roll while the front wheels are depressed in steel pockets.*





# an Hour

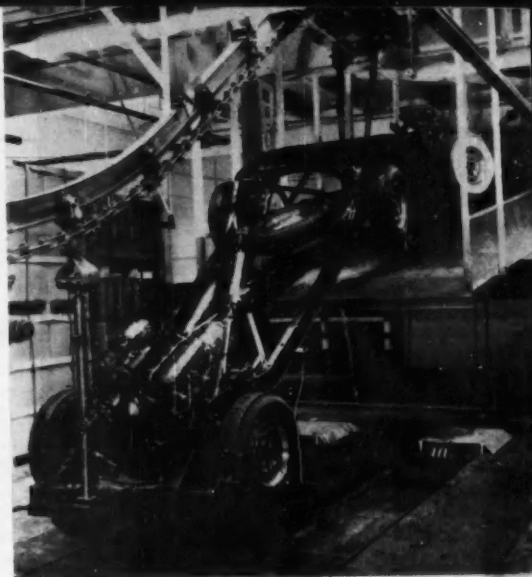
By Joseph Geschelin

Body Div., are moved onto preparation lines on the second floor of the new building, then dropped according to schedule onto the final assembly line directly below. The second floor also produces the front end sheet metal assembly which is delivered onto the final assembly conveyor at another drop. Among the other activities on this floor is the fabrication of gas tanks at the rate of 100 an hour in a surprisingly small compass with a semi-automatic flow of operations of advanced character. Wheel and tire assemblies also are prepared here with the minimum of manual handling and delivered to the assembly line below according to schedule.

Gas tanks are fabricated from the two major stampings forming the shell, stampings being delivered from the press shop in another building. The first major step on an almost fully automatic transfer line, is the preliminary projection welding of small internal stampings to the shell. Then the two halves are placed vertically on a conveyor at the entrance to the washing machine. As they emerge at the exit end, the conveyor is arranged to bring the two halves together into contact before they enter an automatically cycling spot welder where they are simply tack welded.

The next operation is seam-welding of the tank in a resistance welding machine. Soldering of one of the fittings to the tank is done by induction heating. From this point the tanks are distributed automatically by a transfer conveyor to one line or another depending upon the type of gas tank. One of the interesting spots in connection with the gas tanks is the automatic unloading into a chute which carries them to the chassis line. As illustrated, this is done by automatic disengagement of the monorail conveyor hook at the mouth of the chute.

Wheels and tires are delivered by a conveyor to the assembly station without manual loading or unloading from the freight dock. As the assembly is completed and the tires inflated, it moves on a roller conveyor



*The chassis with engine installed reaches the end of the overhead monorail conveyor line and is lowered automatically to the chassis line, where it is carried forward as the wheels rest on a floor-level endless belt.*

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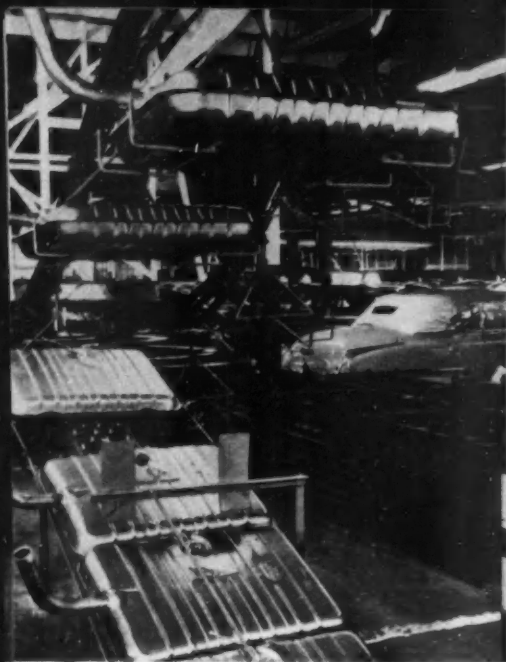
*Practically All Manual Handling  
of Cars and Parts Has Been Eliminated in This Modernized Plant  
With 500,000 Sq Ft of Productive  
Floor Space*

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to a junction point. Here the monorail feeder conveyor is made to dip down to the wheel and tire conveyor and a hook drops down by gravity to engage the wheel. The monorail, in turn, transports the assemblies to a distributing chute with automatic transfer. The chute is provided with an automatic selector arrangement to pick off three wheel and tire assemblies for one side of the chassis and two for the other.

Front end sheet metal and radiator assemblies are built on a merry-go-round. However, instead of the usual oval floor conveyor carrying four or five individual bucks, Olds has a power driven circular table on which are fixed five assembly stations with operators riding at each one while sitting on a stool. As these assemblies are completed, they are transferred to a dress-up conveyor for the installation of head lights, horn, moldings and other parts. From here the units are dropped onto the final assembly conveyor according to schedule.

Let's shift the scene to the main assembly floor. Here is the start of the chassis assembly line, the work being done with the frame suspended from an over-



## 80 Oldsmobiles an Hour

*Automatic unloading of finished gas tanks as they come by conveyor from the second floor. The monorail conveyor hook is automatically disengaged and the tanks go into a chute which carries them to the final assembly line.*

head monorail. A noteworthy feature of the conveyor is found in the design of balanced carriers at both ends. These carriers have outboard wheels running on a track, thus providing adequate freedom from side sway.

It may be noted that one major advantage of the suspended chassis line, apart from the facility with which men can work around it, is that it simplifies the paint spraying operation in the passage through the paint booths.

Because of lack of adequate straight line length for assembly lines, the chassis line consists of two parallel lines with a loop at one end to carry the chassis from one stage to the other. However, the transfer from one branch of the final line to the other is done by means of automatic cross transfer conveyor sections. This eliminates the use of hoists or actual pushing of cars from one line to another.

To facilitate the flow of vendor materials to the assembly lines, all incoming parts and accessories are delivered in palletized form and stored

or disbursed with fork type industrial tractors. Similarly assembly on the lines is facilitated by the installation of standard metal hoppers at the various stations. Thus the workers have within easy reach everything required to do their particular part of the job.

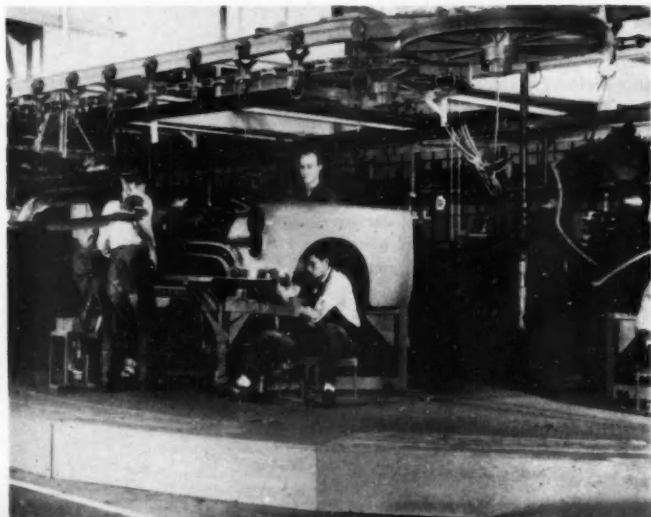
In contrast to the suspended conveyor transport on the chassis line, final assembly is done with the car riding on its wheels on a flat-top, floor level conveyor. Considerable attention was paid to the design of this conveyor. For example, the steel slats have been made wide enough to permit workers to ride them with the forward motion of the line. Wide, ventilated, and fluorescent-lighted pits are provided at areas where underbody work is required. As a measure of safety, entry to the pits is through a gangway located away from the line.

Since timing is of the essence on this compact and fast moving assembly line, such major operations as wheel alignment and headlamp aiming are done while the car is in motion rather than at a fixed station as is the usual practice. For wheel alignment, the fixture is mounted over the assembly conveyor and connected with it. Adjustments are made rapidly while the fixture moves with the car. Similarly, the headlamp aiming fixture is movable on a rail and is pushed by the front end of the car while adjustments are completed.

The entire theme is motion. There are no fixed stations on the assembly line. This principle is well exemplified by what goes on as the car approaches the end of the line where the engine is started and allowed

*(Turn to page 70, please)*

*Front end assemblies are assembled on this merry-go-round, a power-driven circular table on which are fixed five assembly stations. Assembly workers ride along on the merry-go-round while performing their operations.*



# Tough Problems

## Analyzed at the Detroit SAE Meeting

ONE would have to dig far back into SAE records to find a subject as controversial as that of mechanical vs chemical octanes. The argument fanned by Alex Taub culminated in a heavily attended session at the recent SAE National Meeting in Detroit at which S. D. Heron and A. E. Felt of Ethyl Corp., presented their monumental study — "Cylinder Performance—Compression Ratio and Mechanical Octane Number Effects." Compressing in capsule form the results of some two years of investigation with a single-cylinder laboratory engine, the authors provided a package that was impossible to digest on quick reading.

Prepared discussion, with Alex Taub dissenting, tended to confirm some of the basic findings of the authors. It was evident that many of the leading engine experts felt the results of the study provide new avenues for further investigation. One major conclusion — apparently incontrovertible — was that exhaust valve cooling actually had no effect upon the octane requirements of an engine.

### Disposal of Industrial Wastes

The opening session, with L. A. Danse as chairman, was decidedly an innovation in SAE circles. It had to do with a thorough discussion of the disposal of industrial wastes through economic methods of decreasing waste, improving methods of waste disposal, and increasing the salvagability of waste materials. That this is no academic question was quickly evident in the chairman's summary. Regulatory bodies from the level of the Federal Government down to the community in which a plant resides are clamping down on waste disposal. And it is obvious that each plant must work closely with the community to effect proper and economical controls.

Waste disposal not only is a major problem demanding immediate attention; it is also costly unless given the proper approach. At the present writing, according to Danse, General Motors Corp. has spent over \$9-million on waste disposal. The four papers prepared for this session posed the problem from its varied aspects of controlling plating department wastes, disposal of acid wastes, removal of soluble oils from waste water, and smoke abatement.

Featuring over 50 specialists in various aspects

all over the country.

Audience participation was a major attraction of the Clinic. In each of the panels discussion centered about problems and questions posed by the audience. It resulted in airing the controversial and the unusual, as well as the routine.

### Shorter Wheelbase Car

J. H. Wells, sales promotion manager, the Austin Motor Co., Ltd., gave some persuasive arguments in favor of the four-passenger, shorter wheelbase car. His analysis gave the clue to the attitude of the British manufacturer. By producing the same car for both domestic and export markets without further investment in tooling, Austin as an example can well afford to sell its cars in the U. S. at a competitive price. To them, a market of say 50,000 cars is profitable. To a domestic producer this market could hardly justify the necessary investment in plant and tooling.

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By Joseph Geschelin

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### Materials Handling

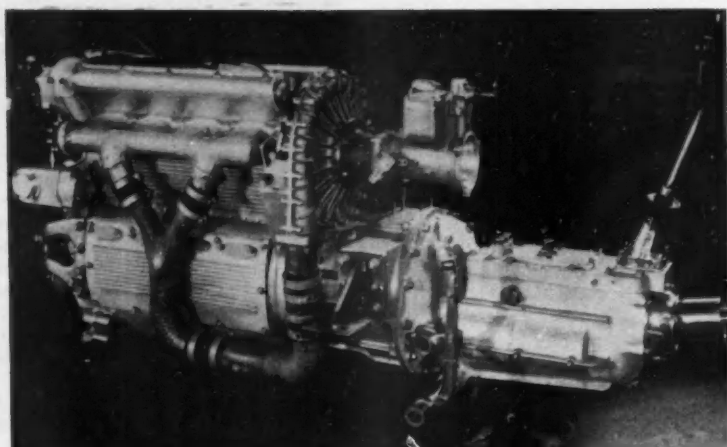
Confirming the fact that materials handling has

become an inseparable part of the production process, E. R. Frost, Fisher Body Div., GMC, emphasized that at Fisher Body it is also a must in coordinating with basic engineering. He brought out the interesting point that economical methods of handling and transportation are a factor in the initial conception of design. Suitable modifications in basic design—generally of minor nature—exert an important influence on shipping costs as well as manufacturing process.

### Plate Glass

That the automotive industries are the largest consumers of plate glass in the U. S. was confirmed by R. A. Miller, Pittsburgh Plate Glass Co., in describing some of the advances in glass in recent years. The one-piece curved windshield has become a major problem. Apart from production costs, there is the matter of seeing. As the windshield is inclined and as it is curved there is introduced the limiting factor

(Turn to page 68, please)



Left side view of the supercharged engine made by Meyer & Drake. The after-cooler was not installed when this photo was taken.

# New

By Louis Meyer,  
Vice-President

and Leo Goossen,  
Executive Engineer  
Meyer & Drake Engineering Corp.

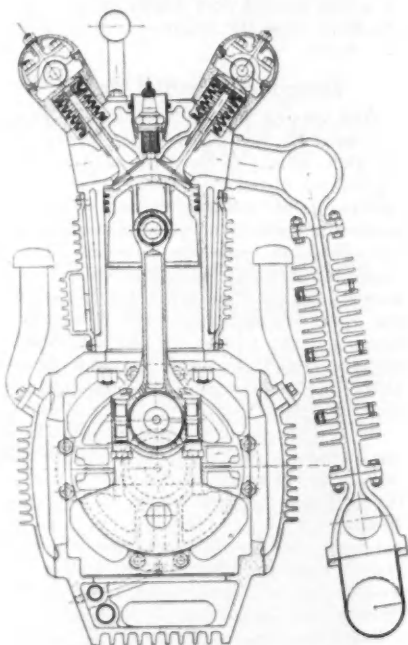
**T**HIS year's Indianapolis race will see our new three-litre Offenhauser supercharged engine in competition for the first time. One of these engines has been completed and dynamometer tested. By race time, four cars will be equipped with the new engine—cars entered by Indianapolis Racing Association, Alden Sampson, Murrell Bellanger, and Kurtis-Kraft.

The engine is basically similar to the Offenhauser unsupercharged 220 cu in. model, with the principal difference in the piston displacement and the addition of the supercharger.

As the engine follows standard racing design, two overhead camshafts are used, operating directly above the valves through valve tappets. Valve inclination is 36 deg each side of centerline. There are four valves per cylinder to obtain the required area, the intake

port diameter being  $1\frac{1}{2}$  in. and the exhaust being  $1\frac{3}{8}$  in. Valves have 35 deg seats and  $5/16$  in. stems. Material for the intake valves is SAE 3140 steel while the exhausts are an austenitic steel.

Cross section of the engine showing details of connecting rod, valve mechanism, after-cooler, etc.



## Condensed Specifications Three-Litre Offenhauser Supercharged Engine

Type	4 cyl in line
Bore	3.875 in.
Stroke	3.750 in.
Displacement	176.8 cu in.
Compression ratio	8 to 1
Supercharger pressure	up to 25 psi maximum
Horsepower	over 425 at 6000 rpm
BMEP	218 lb (approx)
Number of main bearings	5
Weight of Engine	550 lb including clutch (approx)
Weight per Hp	1.28 lb (approx)
Fuel Used in Test	methanol blend
Overall Length	37 $\frac{1}{2}$ in.
Overall Height	25 $\frac{3}{4}$ in.
Overall Width	17 $\frac{1}{4}$ in.

# Offenhauser Engine

## for Indianapolis Race

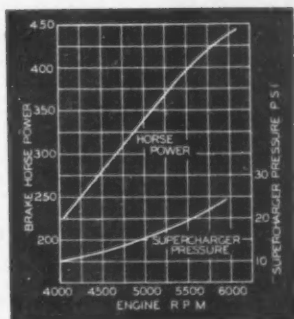
It has not been felt necessary to use sodium cooled exhaust valves although some experimenting is being done in this direction. Meehanite valve guides are used with 0.002 and 0.004 clearance for the intake and exhaust respectively. As is customary racing practice, no valve adjustment is provided; correct clearance is obtained by filing end of stems at assembly. The intake requires 0.016 while an additional 0.002 is necessary for the exhaust. Valve lift is 0.400 in. The cams are ground from the No. 4 master cam giving the following timing: Intake opens 20 deg BTC, closes 56 deg ABC; exhaust opens 48

deg BBC, and it closes 17 deg ATC.

Double valve springs are used, exerting a combined pressure of 250 lb when valve is fully opened. Valve tappets surround the springs and the surface against which the cam bears has a  $1\frac{1}{2}$  in. radius and is hardchromed for wear. A key prevents rotation.

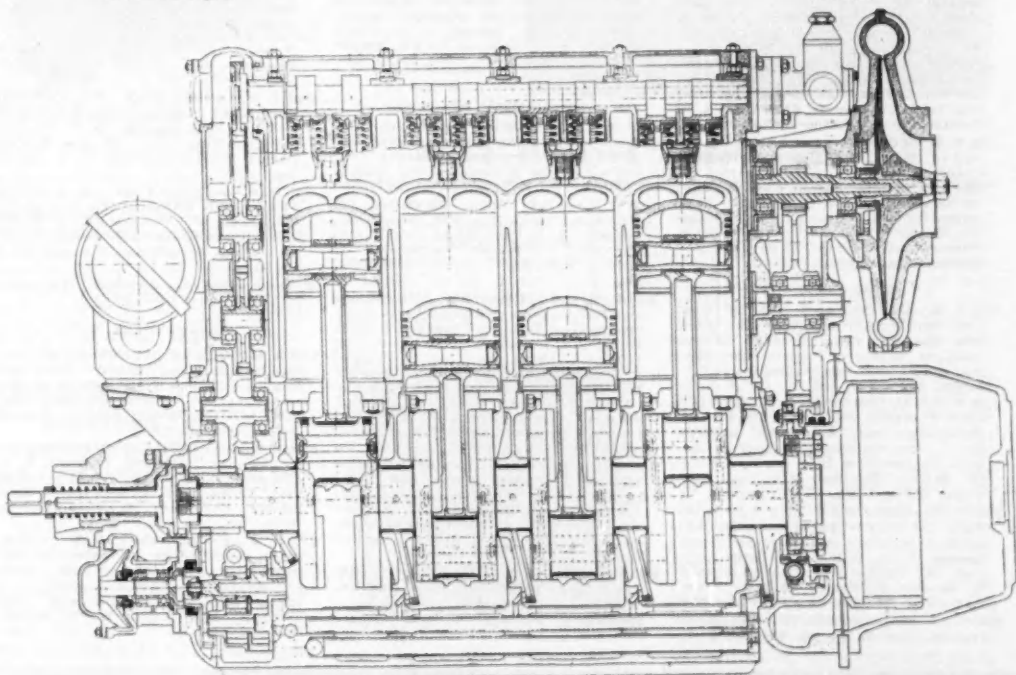
Camshaft material is 4615 steel, carburized and hardened, bearing directly in the aluminum cam housings and lubricated under low pressure oil. The camshafts are driven through a train of 10 pitch spur gears off the front of the

(Turn to page 82, please)



Below is a longitudinal section of the new Offenhauser engine.

Performance curves of new Offenhauser 176.8 cu. in. supercharged engine. Fuel is methanol.





# Cost-Cutting Methods

## to Be Emphasized at Tool Engineers Show

**W**HEN the American Society of Tool Engineers holds its exposition in Philadelphia, April 10-11, more than 300 exhibitors will present their cost-cutting ideas in Convention Hall and Commercial Museum buildings. At the same time, the ASTE will hold its 18th annual meeting that features a five-day program of technical sessions, economic forum, business sessions, plant tours, and technical films. Twenty papers are scheduled for the technical sessions.

Advanced equipment to be displayed — and in many instances demonstrated in operation — will be new machine tools such as lathes of all types, vertical and horizontal milling

machines, bar automatics, second operation chucking machines, production threaders, and boring machines. In addition there will be production and tool room grinders, new machine controls, presses and dies, new developments in cutting tools, and accessories of various types.

There will be advanced devices for materials handling that make possible still greater reduction in labor costs. How assembly time can be reduced by the higher accuracy attainable with new checking and inspection devices will be demonstrated at the exposition. Improved furnaces, some with automatic materials

(Turn to page 64, please)

### Schedule of ASTE TECHNICAL SESSIONS

#### MONDAY, APRIL 10

**9:00 A.M.—DEVELOPMENTS IN PRESSWORKING OF METALS** (Convention Hall Ballroom). (a) "Forming Sheet Metal by the Marform Process." **Speaker:** R. B. Halse, General Supervisor of Manufacturing Research, the Glenn L. Martin Co. (b) "Carbide Die Developments." **Speaker:** G. F. Eglington, V.P., Lincoln Park Inds. **Session Chairman:** Arthur R. Diamond, Mech. Engr., Jackson-Walter Corp.

**10:00 P.M.—COLD EXTRUSION OF METALS** (Convention Hall, Room 200). **Speaker:** J. Parker Bowden, Helintz Manufacturing Co. **Session Chairman:** A. C. Jackson, Pres., Jackson-Walter Co.

**10:00 P.M.—ECONOMICS FORUM** (Academy of Music). **Chairman:** J. S. Hildreth, President, Chilton Co. **Moderator:** Dr. Edwin G. Nourse, Members of the Panel: Dr. Edwin G. Nourse, Dr. C. Canby Halderston, Edward T. Cheyfitz, J. A. Livingston; **Master of Ceremonies:** Paul Wootton, President of Business Papers Editorial Society, Washington, D. C.

#### TUESDAY, APRIL 11

**9:00 A.M.—DESIGN AND USE OF DIECASTING DIES** (Convention Hall, Room 200). **Speaker:** Chas. Franklin, Master Mechanic, Rochester Products Div., General Motors Corp. **Session Chairman:** J. O. Horne, Sales Mgr., Jas. O. Horne & Co.

**2:00 P.M.—AUTOMATION OF GROUND AND TURNED PRODUCTION PARTS** (Convention Hall, Room 200). **Speaker:** N. L. Bean, Chief Design Engr., Automatic Transmission Program, Ford Motor Co. **Session Chairman:** Campbell Pittsinger, Engrg. Dept., SKF Industries.

**2:00 P.M.—MACHINING AND FABRICATION OF HIGH-TEMPERATURE ALLOYS** (Convention Hall Ballroom). **Speaker:** C. L. Sadon, Mfg. Engr., Aircraft Gas Turbine Div., General Electric Co. **Session Chairman:** Gardner Young, Tool Suprv., Westinghouse Electric Corp.

**8:00 P.M.—MACHINABILITY** (Benjamin Franklin Hotel Ballroom). **Speaker:** R. T.

Hurley, Pres., Curtiss-Wright Corp. **Session Chairman:** A. H. d'Arcambal, V.P., Pratt & Whitney Div., Niles-Bement-Pond Co.

**8:00 P.M.—TRENDS IN DRILLING** (Bellevue-Stratford Hotel Rose Room). (a) "Application of Special Drill Units to Standard and Special Machinery." **Speaker:** Eugene Numrich, Application Engr., Avey Drilling Machine Co. (b) "Micro Drilling." **Speaker:** J. A. Cupler II, Gen. Mgr., National Jet Co. **Session Chairman:** H. S. Hunt, Plant Supt., Shipp-Eastwood Corp.

#### WEDNESDAY, APRIL 12

**9:00 A.M.—METAMICS** (Convention Hall, Room 200). **Speaker:** W. O. Sweeny, Jr., Asst. Sales Mgr., Haynes-Stellite Div., Union Carbide & Carbon Corp. **Session Chairman:** D. J. Heckinger, Tools, Inc.

**2:00 P.M.—COLD ROLL FORMING OF METALS** (Convention Hall, Room 200). **Speaker:** E. J. Vanderploeg, Dev. Engr., The Yoder Co. **Session Chairman:** G. A. Rogers, Sales Engr., Rudel Machy. Co., Ltd.

**2:00 P.M.—AUTOMATION** (Convention Hall Ballroom). (a) "Automation in Forging and Heat Treating." **Speaker:** Thomas E. Darnton, Supervisor of Standards, and Willard L. Mantz, Supervisor of Production Engineering, Forge Plant, Oldsmobile Division, General Motors Corp. (b) "Automation in the Press Room." **Speaker:** Herman Zorn, Pres., V & O Press Co. **Session Chairman:** John Whitesell, Supt. of Plant Engrg., The Budd Co.

**8:00 P.M.—TOOLING UP FOR MODERN TRUCK ENGINE PRODUCTION** (Benjamin Franklin Hotel Ballroom). **Speaker:** Joseph Olender, Mech. Engr., International Harvester Co. **Session Chairman:** J. R. Weaver, V.P., Baldwin Locomotive Works.

**8:00 P.M.—USE OF ELEMENT TIME DATA FOR EFFECTIVE TOOL DESIGN** (Bellevue-Stratford Hotel Rose Room). **Speakers:** N. M. Perris and H. K. Keever, Partners, Stevenson Jordan & Harrison,

Inc. **Session Chairman:** C. F. Stephenson, Chief Process Engr., York Corp.

#### THURSDAY, APRIL 13

**9:00 A.M.—HARD SURFACING OF PRODUCTION TOOLS AND GAGES** (Convention Hall Ballroom). (a) "Nitriding of High Speed Steel Tools and Gages." **Speaker:** J. G. Morrison, Ch. Metallurgist, Landis Machine Co. (b) "Hard Chrome Plating." **Speaker:** B. A. Taylor, V.P., Chrome Electro-Forming Co. **Session Chairman:** Eric Lund, Ch. Tool Engr., Link-Belt Co.

**2:00 P.M.—BROACHING APPLICATIONS FOR COST REDUCTION** (Convention Hall Ballroom). **Speaker:** O. W. Bonnafe, Ch. Res. Engr., The LaPointe Machine Tool Co. **Session Chairman:** P. A. Patterson.

**2:00 P.M.—AUTOMATION IN HOPPER FEEDS FOR ASSEMBLIES** (Convention Hall, Room 200). **Speaker:** C. E. Kraus, Pres., Kraus Design, Inc. **Session Chairman:** Frank J. DeFrates, Supt., Kruse & Slattery.

**Evening—ANNUAL BANQUET** (Bellevue-Stratford Hotel Ballroom).

#### FRIDAY, APRIL 14

**9:00 A.M.—DESIGN ECONOMICS** (Convention Hall Ballroom). **Speaker:** John Van-Hamersveld, Supervisor, Design Cost Control Group, the Glenn L. Martin Co. **Session Chairman:** Dwight Renfrew, General Supt., Link-Belt Co.

**2:00 P.M.—INVESTMENT CASTING** (Convention Hall Ballroom). **Speaker:** T. F. Frangos, Sales Engr., Haynes-Stellite Div., Union Carbide & Carbon Corp. **Session Chairman:** E. Hollingsworth, Tools, Inc.

**2:00 P.M.—EFFECT OF LATEST AMERICAN STANDARDS ON SPINDLE DEFLECTIONS** (Convention Hall, Room 200). **Speaker:** Dr. Max Kronenberg, Consulting Engr. **Session Chairman:** Emil Kitzman, Sales Engr., W. E. Shipley Machinery Co.

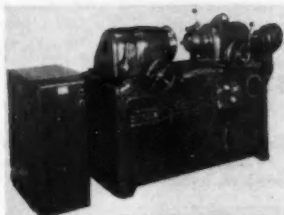
# What is New at the ASTE Exposition

FOR ADDITIONAL INFORMATION regarding any of these items, please use coupon on PAGE 56

## ASTE-1—Gear Sound Tester

Booth 601

Included among latest equipment for checking gears dimensionally and recently designed broaches to be shown by National Broach & Machine Co., Detroit, Mich., is a new sound tester for both external and internal gears. The tester is especially suitable for planetary gear assemblies used in automatic transmissions. With it, gear sets which are objectionably noisy in operation can



National Broach sound tester for external and internal gears

be detected and corrected before reaching assembly. The tester is built in two sizes, one for gears up to 14 in. in diam and the other for gears up to 24 in. in diam. Tests are run at four different speeds in either direction with or without gear loading. The machine can be equipped for air clamping to expedite loading and unloading.

Booth 563

## ASTE-2—Three Inspection Tools

Magnaflux Corp., Chicago, Ill., will show three major inspection tools, using inspection by Magnaflux, Zyglo, and the Sonizon.

The Magnaflux type KDN unit, the featured piece of equipment, is the small portable wet-type unit using Magnaglo for flexible process control in forge plants, foundries, tool shops, or manufacturing plants. Completely self-contained, this KDN unit need only be plugged into a 220 volt line for ready

The Toolgraph chart, developed by Illinois Tool Works, Chicago, Ill., is produced on this hob lead checker (right) and recorder. The chart becomes a graphic record showing exact location of each tooth on a hob in relation to all other teeth, and in relation to a desired theoretical lead helix. Showing these relationships in chart form reveals the pattern as well as the magnitude of any errors more clearly than the tables of indicator readings formerly supplied with hobs, claims the company.



Booth 756

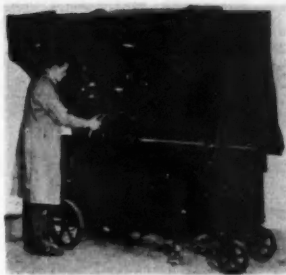
## ASTE-3—Hob Lead Checker and Recorder

operation and inspection of parts up to 54 in. long. Wheel equipped, it has a tow-hitch for attachment to plant trucks for taking to any local point where trouble is occurring due to cracking of parts within a plant.

Flexible and inexpensive Nondestructive Testing gives positive segregation of cracked parts, allows optimum and flexible process control so that cracked parts are not made in high volume, and avoids expensive final inspection scrapping of fully machine parts.

A Zyglo type ZA-21 Unit will be in operation, as used in the tool crib to find cracked carbide tools, and the cause of that cracking, or in foundry control on non-magnetic castings. Both the inspection with Magnaglo and Zyglo furnish fluorescent glowing indications of defects on the part, and are more quickly inspected under black light than if only a partially effective mere visual inspection were used.

The Magnaflux Sonizon on ultrasonic thickness measuring instrument, will be demonstrated, as used to locate core shift in castings or lack of bond in bearings or for critical wall thickness measure from one side only.



Magnaflux type KDN unit, small portable wet-type inspection tool

# What is New at the ASTE Exposition

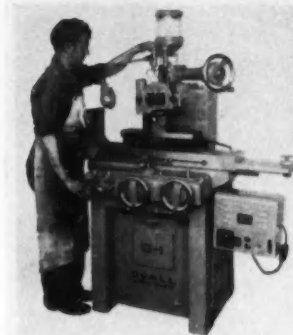
For additional information regarding any of these items, please use coupon on page 56

## ASTE-4—Miller and Grinder

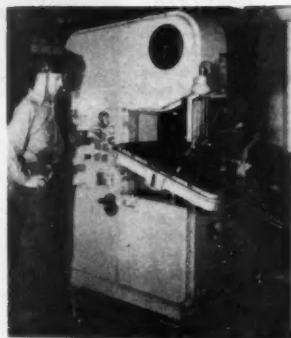
Line milling and line grinding, two new developments for band machining will be introduced by the DoAll Co., Des Plaines, Ill., in daily demonstrations of its new Contour-matic manufacturing machine tool. The Contour-matic is claimed the first band machine

Booth 121 are welded in the form of teeth. In its cutting action there is an equalized balance between bonding and abrasive grits which gives a constant degree of abrasive exposure. The blade, available in 54, 60, 70 and 80 grit, gives complete selection for cutting and grinding many different types of alloys, geological materials, etc.

"Cool Grinding" on the DoAll super precision surface grinder will be demonstrated showing how this new



Do-All surface grinder



Do-All contour-matic for line milling and line grinding

tool to have complete hydraulic operation in its control of tool speed, work table feed, tool post, table tilt, blade tension and brakes. Operation is controlled from a central panel, the operator no longer hand-feeding materials or making hand adjustments. This is done hydraulically instead by dial controls. New design construction, work holding facilities on table, and infinite stepless speed range from 40 to 10,000 fpm permit all solid materials to be cut on a semi-automatic production basis in this one machine.

Twenty-seven band cutting tools permit sawing, milling, filing, grinding, honing and polishing operations. For line milling operations, a band cutting tool with tungsten carbide tipped teeth is used. The Contour-matic also provides pressure blade lubrication.

Development of the new DoAll line grinding and honing blade, provides a new technique for cutting and shaping hardened dies, tools and high temperature alloys.

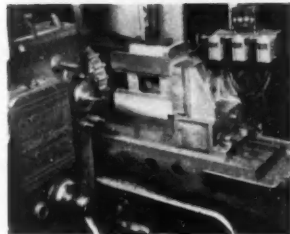
The blade is a tough alloy band on which cubical molded abrasive matrices

grinding method cools not only the work but the cut as well, providing full visibility and elimination of coolant tanks, pumps, etc.

Booth 907

## ASTE-5—Magnetic Chucks and Coolant Separators

The Sunstrand Magnetic Products Co., Division of Sunstrand Machine



Sunstrand general purpose magnetic chuck

Tool Co., of Rockford, Ill., will exhibit power-grip magnetic chucks in a display of cost-cutting magnetic work-holding setups for keyway milling, die block milling, form grinding, etc.

Their newly developed work-holding fixture for general purpose milling work is a complete unit with Viking Chucks mounted on an adjustable fixture. Chucks are positioned at any angle from zero to 90 deg. Time losses for adjusting mechanical clamps are eliminated.

Sundstrand will also introduce a magnetic coolant separator. The basic unit can be installed on all types and models of grinders without alteration. Operation is continuous with no shut-downs for cleaning.

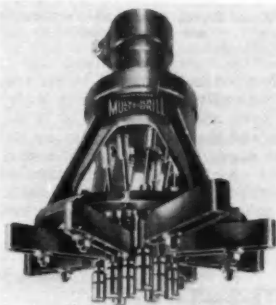
The Sunstrand Pneumatic Division will have an operating exhibit of single and double pad portable sanders for sanding, rubbing or polishing on metal, wood and plastics. Latest of the company's line of bench centers and balancing tools for checking and inspection will also be shown.

The Sunstrand Hydraulic Division will have an operating exhibit of their new pumps, valves, fluid motors and tank units which conform to J.I.C. standards.

Booth 426

## ASTE-6—Multiple-Drill and Tapping Head

The Commander Mfg. Co., Chicago, Ill., is featuring a new tapping head, claimed to handle taps from 0 to 3/4



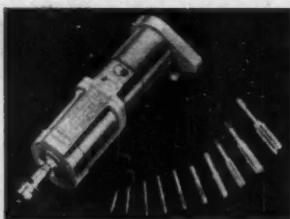
Commander Multi-Drill

in.—a range usually requiring three or more tapping heads. The new taper can be furnished to fit any drill press.

The taper employs a spring clutch drive and an adjustable torque control, said to afford extreme sensitivity. The taper is suited for cycle tapping and OD threading, as well as for routine machine tapping. Accurate blind hole tapping is accomplished without dam-

age to taps and equipment because of the Multi-Torque control.

The spring clutch drive is said to eliminate slippage and wear caused by misadjustment and misuse, and is impervious to oil, grease, moisture, weather, etc. Torque can be set when the taper is on or off the drill press, by merely pushing a button and turning the scale to the desired position for the tap to be used.

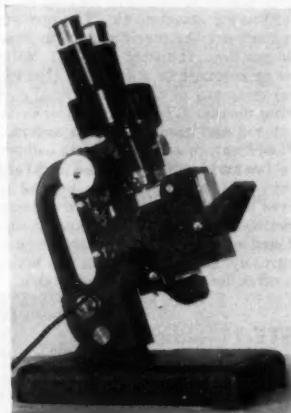


Commander taper head

Wider application has been added to the Commander Multi-Drill with the addition of optional single size spindles. The new spindles increase the drill size capacity of the Multi-Drill without decreasing the center-to-center capacity. The single spindles are available for both the No. 500 six spindle model and No. 900 eight spindle model.

Booth 209

### ASTE-7—Comparison Microscope



Leitz comparison microscope to be exhibited by George Scherr Co., Inc., for comparing a finished surface with a standard master. When viewed, the image of both the master and the workpiece appear alongside each other without any separation, for accurate reliable comparison. The microscope produces a three-dimensional stereoscopic image. A transformer permits adjustment of the direction of light to bring out the grinding marks of the finish.

## What is New at the ASTE Exposition

For additional information regarding any of these items, please use coupon on page 56

### ASTE-8—Air Comparator Gage

Booths 815 and 632

At Booth 815, Pratt & Whitney of West Hartford, Conn., will high-spot their new Model F Air-O-Limit Comparator having wide range of applications including the checking of internal and external diameters, straightness, width and length, taper, out-of-roundness, etc. Another Air-O-Limit gage contains the Duplex Indicator—a new Pratt & Whitney development for two station gage applications. This indica-



Pratt & Whitney Air-O-Limit comparator gage, Model F

tor incorporates two independent gage indicators with individual pointers, permitting dual readings on one meter.

Among cutting tools on display will be a new line of Keller milling cutters, Hi-Helix end mills with cupped ends, and carbide tipped and solid carbide taps, cutters and reamers.

At Booth 632 there will be demonstrations of the new Di-Bur—the carbide bur with the diamond fluting which produces granular chips and which cuts the toughest die steel; and the Diaform wheel-forming attachment for form dressing grinding wheels to a "tenth" accuracy.

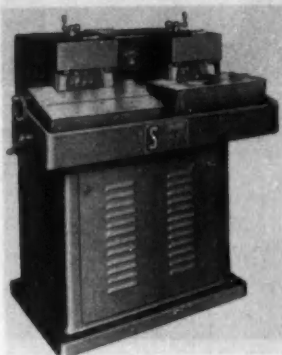
### ASTE-9—Carbide Tool Grinder

Booth 965

Permitting "one step from rough to finish grind," a twin-wheel wet or dry carbide tool grinder on display by the Standard Electric Tool Co. of Cincinnati, Ohio, provides changing wheels or renewing the V-belt drive in five min.

Operator visibility and comfort is predominant. There is no spray nor splash. A single 3-way coolant control valve is provided for the two spouts at each wheel. Reverse rotation is through a control switch. Exhaust outlets are built in for dry grinding.

The tilting tables are stationary and degree-graduated. There is only one moving part. A turn of the crank handle brings the grinding wheel toward the table for minimum clear-

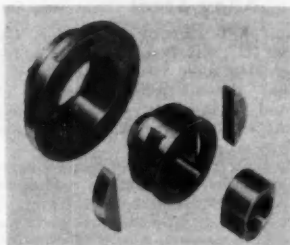


Standard Electric twin-wheel wet or dry carbide tool grinder

ance. The crank handle moves a splined spindle quill in housing. V-belt drive alignment is maintained.

Booth 2

### ASTE-10—Fixture and Drill Jig Lock



Recently made available by the Siewek Tool Co., Detroit, Mich., is this improved cam-type automatic fixture lock and drill jig lock. Only two parts of the lock—the steel braking shoes—receive wear.



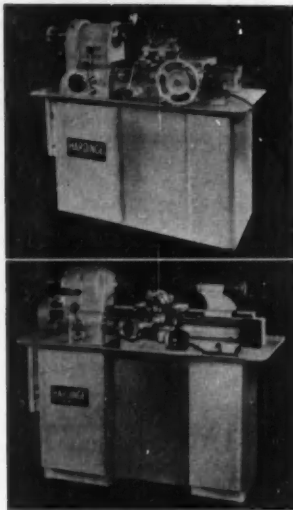
What is  
New

# at the ASTE Exposition

For additional information regarding any of these items, please use coupon on page 52

Booths 701 and 835

## ASTE-11—Lathe and Chucking Machine



Top—Chucking machine, Model HC with 13 in. swing, speeds to 3000 rpm, 8 position turret, and hardened and precision ground steel dovetail bed ways on display by Hardinge Brothers, Inc., Elmira, N. Y.  
Bottom—Hardinge tool room lathe, Model HL with 10 in. swing, 1 in. collet capacity, speeds to 3200 rpm, independent electric feed for carriage and cross slide, and hardened and precision ground steel dovetail bed ways.

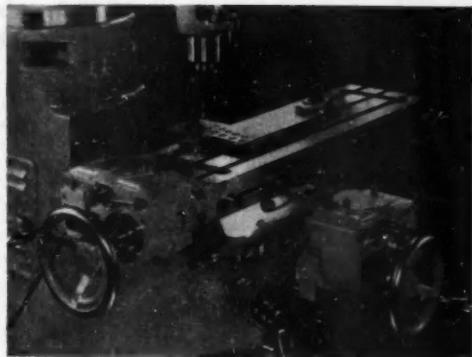
Booth 334

## ASTE-12—Free Machining Alloy Steel

Joseph T. Ryerson & Son, Inc., Chicago, Ill., will feature Rycut, a free machining alloy steel, to be shown in actual demonstrations proving improved machinability of Rycut compared with standard alloys in the same carbon range.

As a basis for study of relative value, the company states that in comparison to AISI 4150, Rycut hardenability is approximately the same, savings in machining time range from 25 per cent to 50 per cent, tool life is increased up to 100 per cent, and less grinding time required after hardening due to the better surface finish secured by machining.

Benson Coordinators applied to machine tool for fast and accurate hole-positioning



Booth 310

## ASTE-13—Screw Machine and Lathe Attachment

A precision lathe and screw machine attachment for automatic turning and tapering to close tolerance will be displayed by the Todd Co., Inc., Rochester, N. Y. The device, known as the Karge Turnomat, is designed for extremely slender turning of either shafts or tubing. It provides working tolerances down to tenths, handling of work of great length, and production of ground-like finish.

Turnomat can be used for turning plastics, fibre and rubber, as well as metals. It will fit any size or make of lathe or screw machine. It also will center to extreme accuracy, drill, ream, tap, thread, thread chase and taper. Tapers can be worked down to a needle point.

The attachment is available in six models. Four models are designed for turning and two models for tapering.



Todd lathe and screw machine attachment, the Karge Turnomat

## ASTE-14—Hole Positioning Device

Coordinators — attachments for machine tools on display by Benzon Machine Co., Lansdale, Pa. — afford fast accurate hole positioning without use of scales, verniers, rods or other conventional measuring devices. These Coordinators locate a pattern of holes and reproduce the pattern as often as desired through pre-formed records cut

on cylinders. Using the ordinate system of hole location they combine ordinates dimensioned from two perpendicular base lines. The ordinates locate the centers of holes to be machined.

The ordinates, combined in the Coordinator, are first recorded on the cylindrical records with micrometer accuracy. These recordings or Micro-patterns, cut on a small portable recorder machine, are then mounted in the Coordinator attachment. The operator can next set the machine tool to every hole-position recorded without reference or recourse to a drawing (for centers) or to any of the conventional measuring means. The Micro-Patterns can be stored and used for repeat orders.

Coordinators are designed to compensate for errors in the pitch of traverse screws and racks which are beyond required tolerances; to eliminate or lessen necessity for jig making; and to layout and center-drill hole-patterns more accurately and quickly than the layout can often be made on a layout table.

Booth 957

## ASTE-15—Line of Combination Valves

Newly expanded line of CV series valves which offer nearly 280 distinct valve combinations using a basic body casting in  $\frac{1}{2}$ -in. and  $\frac{3}{4}$ -in. pipe sizes is item of interest to be displayed by Modernair Corp., Oakland, Calif. Virtually all fourteen basic valve models—hand, foot, cam pilot pressure or secondary valve operated valves—may be used in combination with seventeen different left end attachments — roller, cam, foot pedal or palm button return.

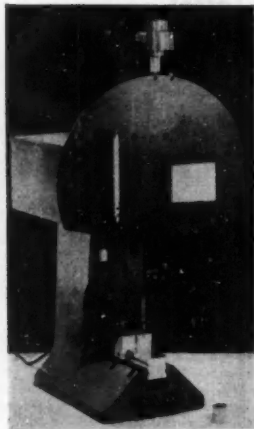


## ASTE-16—Thickness Gage

Booth 407

Capable of readings direct to 0.0001-in., the new three-in. thickness gage offered by Bausch & Lomb, Rochester, N. Y., is designed for accurate, rapid control at production speeds.

To prevent thermal errors due to contact by operator's hand, the measuring point is raised by a chain lift and lowered gently to the object by an escape mechanism. Readings are taken from a glass viewing screen on which magnified images of the scales are shown. The screen shows a vertical scale reading to hundredths and a horizontal interpolating scale reading directly in 0.0001-in.



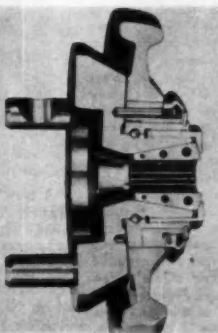
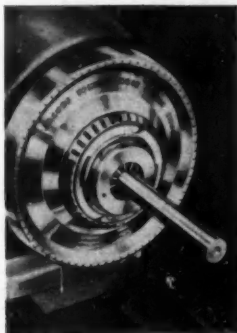
Three-in. Bausch & Lomb thickness gage

It is recommended that a 68 F operating temperature be maintained and that temperature fluctuations near the instrument be kept at a minimum.

Booth 671

## ASTE-17—Spindle Nose Lathe Collet Chuck

To be featured by the Jacobs Mfg. Co. of Hartford, Conn., is a new spindle



Jacobs spindle nose lathe collet chuck with rubber-flex collets

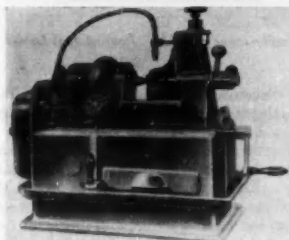
nose lathe collet chuck and its rubber-flex collets. Each of the collets has an individual range of  $\frac{1}{16}$  in., and only eight collets are therefore required to bridge the range from 1/16 in. to 1 in.

Multiple parallel jaws with long bearing surfaces distribute the grip equally throughout the collet and do not allow concentration at the nose when they are closed down below nominal size. The rubber in the collet is moulded to provide a complete seal over the work, and prevent entry of chips, dirt and coolants into the chuck. The rubber is permanently bonded and mechanically locked to the jaws.

The chuck is particularly adapted for holding thin walled parts, tubing, fragile materials, plastics, wood, and soft metals.

Booth 209

## ASTE-18—Automatic Gear Hobbing Machine



Koeper automatic gear hobbing machine, Model W111, displayed by the George Scherr Co., Inc. For small spur, spiral and worm gears from 3/16 in. to 4 1/4 in. diam. 82 DP to 12 DP, the machine has advantages for hobbing small diam multiple thread worms.

# What is New at the ASTE Exposition

For additional information regarding any of these items, please use coupon on page 56

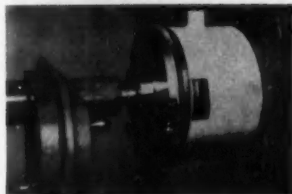
Booth 947

## ASTE-19—Solid Ring Thread Gage

Republic Gage Co., Detroit, Mich., has just added to its line a titanium solid ring thread gage of the insert type with knurled aluminum collar. The ring is light weight and not fragile, having inherent self-lubricating properties. It is said to provide a completely functional method of checking male threads with gage wear reduced to a negligible minimum.

Booth 240

## ASTE-20—Collet Chuck Air Cylinder

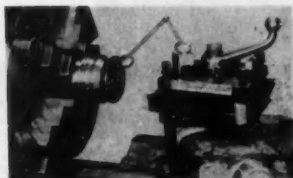


To be shown in turret lathe operation is this air cylinder of the Erickson Steel Co., Cleveland, Ohio, developed to operate Erickson precision collet chucks and expanding mandrels.

Booth 303

## ASTE-21—Midget Magnetic Holders

Enco Mfg. Co. of Chicago, Ill., is presenting their new Miti-Mite group of magnetic base indicator holders and magnetic base Handi-Lites having countless uses in every shop. The vee block base construction allows them to be mounted on both flat or convex surfaces such as a milling machine arbor. The fifty pound pull of the magnet allows its use in many instances as a



Enco Miti-Mite indicator holder mounted on square turret in a lathe without disturbing the setup to true up the work

# What is New at the ASTE Exposition

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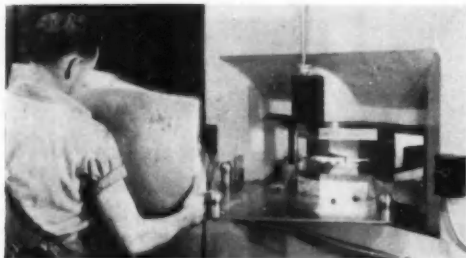
sweep indicator. Suited for use on lathe, planer, shaper, grinder, or any application where a fixed indicator is required, the universal ball-socket-and-swivel construction permits either unit to be used at almost any conceivable angle.

## ASTE-22—Electric Erasing Machine

Booth 801



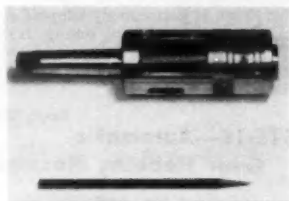
Smooth erasures on tracings, drawings, copy, etc., are provided in a matter of seconds through the revolving accurately controlled and firmly held 7 in. eraser embodied in the hollow shaft electric erasing machine announced by the Charles Bruning Co., Inc., Chicago, Ill. Eraser is actuated by a quiet running vibration-less shaded pole brushless motor, not interfering with radio or radio transmission. Three 7 in. erasers are packed with each machine—soft, medium and gritty in texture. The 7 in. length eliminates nuisance of frequent changings in drafting room, art, statistical, stenographic and accounting departments.



## ASTE-23—Floating Tool Holder

Booth 843

Scully-Jones & Co., Chicago, Ill., announces the All New "JA" floating tool holder, employing a principle well proven in the power transmission field to compensate for misalignment between shafts, but claimed unique in floating tool holder design. A double gear or spline drive coupling gives unrestricted parallel and/or angular float



Scully-Jones new "JA" floating tool holder

for accurate tapping, reaming, etc. Misalignment between tool and work is said to be instantly corrected.

Cutting tools align themselves and enter holes without cramping or bending. Equal freedom of float in all directions—even under heavy loads—is provided by the drive coupling and two standard ball thrust bearings. The floating holder is recommended for

## ASTE-24—One Corner Drawing Press

Booth 844

Development and production of a one-corner-at-a-time hydraulic drawing press, known as the Vulcan-Draw, has been announced by the Vulcan Tool Co., Dayton, Ohio. Since only one corner is dealt with at a time, various corner radii covering different styled panels can be fabricated in the same equipment. Tooling for the machine amounts to a simple single corner punch and die, which can be changed within a few minutes. Different panel sizes of the same style require no die changes.

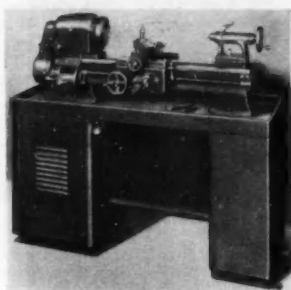
close center and multiple spindle work because of its small diameter.

Wear of the floating elements is practically eliminated due to positive lubrication of all parts during operation. The large areas of lubricated surfaces cushion torsional shock and overload. The outer shell of the holder—with its "O" ring—is a perfect seal to retain lubricant and keep out chips and dirt.

The "JA" floating holder is available in three sizes with Morse Taper shanks and collets.

## ASTE-25—New Model Lathes

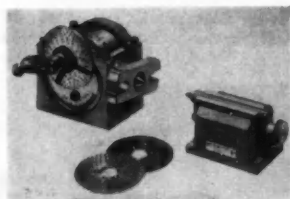
Booth 1045



Model 955 lathe offered by Logan Engineering Co., Chicago, Ill., provides a 1 in. collet capacity, 1 1/8 in. hole through spindle, 11 1/8 in. swing, 24 in. between centers, and is mounted on a modern pedestal base with underneath drive. The spindle is mounted on New Departure ball bearings with 12 spindle speeds from 45 to 1500 rpm. Quick change gear box gives 48 thread selections, right or left, from 4 to 224 threads per in.. A 957 Model, identical to 955 but with 36 in. between centers, is also available.

## ASTE-26—Dividing Head

Booth 1010



Marvin dividing head

A new dividing head produced by the Marvin Machine Products, Inc., Detroit, Mich., is designed for dividing operations in layout, squaring shafts, fluting taps, gear cutting, splines, reamers, hex screws and cams. Mounted on two heavy trunnions it has a conventional 40:1 worm gear adjustable

for take up, can be tilted from 5 deg below the horizontal axis to 30 deg past the vertical axis or a total of 125 deg, and is supplied with three index plates having six sets of holes each. The tail stock has two pins that align it in a horizontal position with the head stock, and it is vertically adjustable for tapered work.

Booth 714

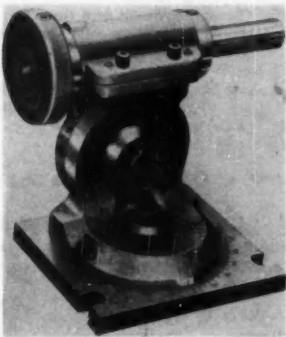
## ASTE-27—Reversible Plug Gages



Thread plug gage of reversible type, available in all sizes from No. 5-40 in NC, NF, NEF and special thread forms, to be exhibited by Size Control Co., Chicago, Ill. Use of carbide gives gage maximum service life and eliminates allowances ordinarily made for production wear. This permits passage of parts which might normally be rejected for rework or scrapping, company points out.

Booth 513

## ASTE-28—Dial Type Grinding Fixture



Grinding fixture featured by the Madison Mfg. Co., Muskegon, Mich., substitutes Vernier adjustments with dials graduated in degrees, in all three planes. It offers automatic indexing for Madison tools and others where 180 deg indexing is required.

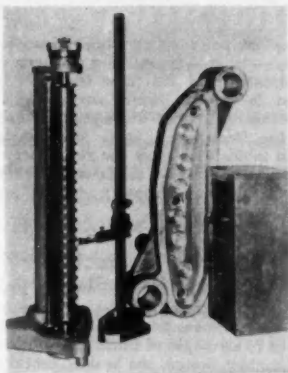
Booth 924

## ASTE-29—Surface Plate Inspection Tool

Used as a master setting gage for surface plate inspection, the Pla-Chek displayed by Cadillac Gage Co., Detroit, Mich., in fifteen seconds or less, establishes any dimension within its 24-in. range to limits of less than one ten-thousandth inch accuracy. Providing height gage or micrometer settings rapidly, no auxiliary gage blocks are necessary in this totally self-contained instrument. Dimensions can be taken either from the surface plate or from

# What is New at the ASTE Exposition

For additional information regarding any of these items, please use coupon on page 56



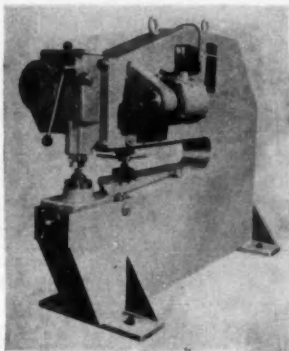
Cadillac Pla-Chek for surface plate inspection

a base line on the work. Measuring bar is not touched by hand and is unaffected by body heat.

Booth 958

## ASTE-30—Sheet and Plate Cutting Machine

Main attraction of the line of sheet steel and plate cutting machinery on exhibition by American Pullmax Co., Inc., Chicago, Ill., is the Pullmax Major whose cutting is performed by a movable upper tool operating at a very high reciprocating speed. The cutting operation does not chip or deform



American Pullmax plate cutting machine, "Motor" Model

edges, and in most cases, edges require no further finishing after cutting.

The Pullman Major, largest of the line of seven machines, cuts the finest gage steel up to plate of 11/32 in. thickness, performing straight cutting, inside or outside circle cutting, inside or outside square cutting, inside or outside design cutting, slot cutting, bending, folding, flanging, and nibbling. The machines also work stainless steel, non-ferrous metals, wire mesh and plastic sheets.

Booth 908

## ASTE-31—Sheet Metal Fabricator



Operating demonstrations of this Wales sheet metal fabricator including the time studies produced by this new machine will be central point of interest at booth of the Wales-Strippit Corp., North Tonawanda, N. Y. The fabricator punches, notches and nibbles sheets, angles, channels and extrusions up to 1/4 in. thick mild steel. A typical setup of Wales hole punching and notching equipment will also be in actual operation in a Bliss stamping press with complete time studies on work produced.

Booth 607

## ASTE-32—Silver Brazing Alloys

At the operating exhibit of Handy & Harman, New York, N. Y., demonstrations will feature joining of ferrous and non-ferrous metals with the silver brazing alloys, Easy-Flo and Sil-Fos. One brazing station will feature torch brazing, showing how these low temperature alloys make strong, ductile

(Turn to page 67, please)

# Publications

## AVAILABLE

New Industrial Literature listed in this department is obtainable by subscribers through the Editorial Department of **AUTOMOTIVE INDUSTRIES**. In making requests please be sure to give the **NUMBER** of the item concerning the publication desired, your name and address, company connection and title.

### H-80 Power Tools

Walker-Turner Div., Kearney & Trecker Corp.—An attractive, 36-page catalog describing the company's power tools for wood, metal and plastic has been made available. It is printed in two colors, is illustrated and gives complete specifications and operating conditions for each machine.

### H-81 Standard Header Die Nibs

Carboloy Company, Inc.—A new bulletin, Supplement D-4, lists the latest addition to the company's standard stock die items. The bulletin gives specifications and prices of the various sizes of the carbide header die nibs carried in stock in rough cored state.

### H-82 Corrosion-Resistant Alloys

Haynes Stellite Div., Union Carbide and Carbon Corp.—A new edition of the 40-page booklet "Hastelloy High-Strength, Nickel-Base, Corrosion-Resistant Alloys" is available. It tells the

complete story of the four Hastelloy alloys—what they are, how they can be fabricated and also how they can be used to combat severe corrosion. In addition to a brief description of each of the four alloys, there are easy-to-read tables that show the resistance of the Hastelloy alloys to six common corrosive media. Property tables and graphs are included.

### H-83 Electrical Contacts

Fansteel Metallurgical Corp.—A new, 36-page illustrated booklet contains information on electrical contacts. In addition to six pages of fundamental notes for contact design, the booklet contains a thorough discussion of electrical contact materials, their properties, advantages and principal uses. A 7-page illustrated discussion of practical assembly methods, including riveting, spinning, upsetting, spot welding, etc., is included. The booklet has a glossary of electrical contact engineering terms, and a series of captioned illustrations which enable

the reader to recognize symptoms of electrical contact failure.

### H-84 Dust Control Equipment

The Ducon Co.—A new 12-page catalog, "Duclone Collectors for Industrial Dust Recovery," describes constructional and operating features of Duclone Collectors. Efficiency curves, schematic drawings of industrial applications are included in the catalog.

### H-85 E-Steel

Jones & Laughlin Steel Corp.—The publication of a revised edition of the original booklet on E-Steel has been announced. It gives a more complete description of the new Bessemer Screw stock, and adds additional material from the first year's industry-wide experience.

### H-86 Drying Ovens

Kellogg Div. American Brake Shoe Co.—A new bulletin describes Auto-Bake, a mobile infra-red paint drying oven designed for automotive use. Dimensions of various models are described as well as general construction features of the units. A table lists complete specifications for each.

### H-87 Speed Reducers

The Cleveland Worm and Gear Co.—An attractive booklet, in color, describes and illustrates Types Nu and ND, Vertical Speed Reducers. Sectional drawings show the various features of the two types. Thrust load and overhung  
(Turn to page 86, please)



**THIS TIME SAVER COUPON** is for your convenience in obtaining, **WITHOUT OBLIGATION**, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.

**Readers' Service Department,  
Automotive Industries,  
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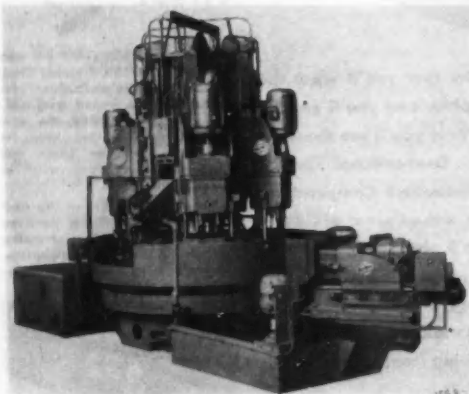




# NEW EQUIPMENT



FOR ADDITIONAL INFORMATION regarding any of these items, please use coupon on PAGE 56



*Davis & Thompson Roto-Matic station type indexing machine for operations on front suspension support arms*

## J-47—Vertical Indexing Machine

The Roto-Matic station type vertical indexing machine presented by the Davis & Thompson Co., Milwaukee, Wis., is designed to eliminate all known elements that might contribute toward down time in the drilling and reaming of two suspension holes and the king pin hole of automobile front suspension support arms.

Six stations provided with two station holding fixtures take both a right and left hand part so that work pieces are removed in pairs. There are five working stations and one loading station. After the first revolution of the machine a pair of finished pieces is removed at each index of the table. Indexing through a hydraulic mechanism eliminates the shock normally encountered during acceleration and deceleration of the table.

Roto-Matic power heads, in both vertical and horizontal mounting positions, have a mechanical electrical feeding mechanism embodying use of a feed screw. Change gears vary the feed and spindle speeds. Lubrication is automatic. A special disk clutch on the screw feed has automatic throw-out in event of overload. Dwell is accomplished by time relays. Design permits any combination of rapid traverse, feed, dwell and rapid return.

Cycling of the machine proper and power heads is completely automatic.

A safety feature is provided by a panel of pilot lights, each controlled by

a power head. When the heads are retracted the lights are out. As soon as the heads begin their automatic cycle the lights are lit and remain lit until the heads return to their retracted position.

## J-48—Six-Spindle Screw Machine

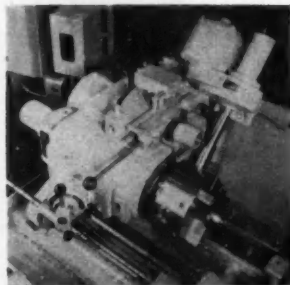
Greenlee Bros. & Co., Rockford, Ill., recently completed a 1½-in. 6-spindle screw machine for handling pre-cut bar and tubular stock in length from 30 to 60 in. This machine permits a turning operation on the back end of the stock, thereby eliminating a second operation.

The stock is loaded into an adjustable magazine at the rear of the machine

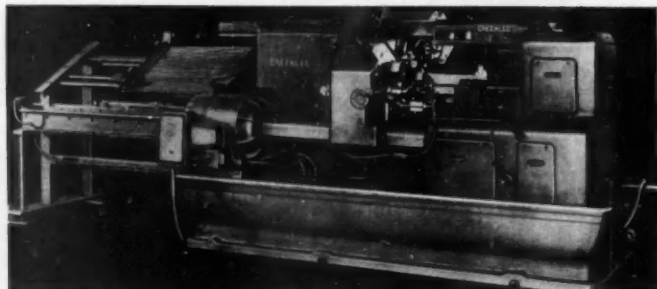
which holds up to 40 bars of ¾-in. diam. material. An air cylinder, operating a loading bar, advances the stock into the spindles, where it is accurately positioned by a swing-type stock stop that is automatically cleared from the tooling area after the loading cycle is completed.

At the same time the new bar is loaded into the spindle, the completed piece is moved forward into a live-roll mechanism which propels it through a sleeve in the gear box and out through the front of the machine.

## J-49—High Speed Air Cylinder



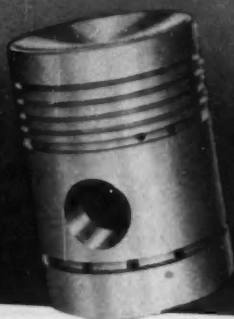
*New high speed aluminum body air cylinder for use with power chucks and designed to operate at spindle speeds up to 6000 rpm. is offered by the Cushman Chuck Co., Hartford, Conn. Light weight and resultant reduction in flywheel effect has been combined with ample power to actuate the heaviest chucks now being used on this type of application, while eliminating previous troubles with air leakage.*



*Greenlee 6-spindle screw machine for pre-cut bar and tubular stock.*



Air Craft



Wing Head



Two Cycle



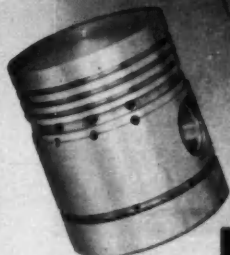
Steel Truss



Turbulator head



T-Slot



Trunk Type

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# NEW PRODUCTS

FOR ADDITIONAL INFORMATION regarding any of these items, please use coupon on PAGE 56

## K-102—Fork Truck Inverter Device

Revolving 360 deg in either direction, the Towmotor milk inverter revealed by Towmotor Corp., Cleveland, Ohio, consists of two forks fixed at the top and two at the bottom of a specially designed back plate on the standard Towmotor revolving carriage. A second plate mounted on one side holds the cases safely in position during the turning process.

To invert cartons of milk, an empty pallet is placed on the upper pair of forks. The lower forks are then inserted under the pallet which supports the load. The entire compact multi-carton unit can then be picked up and rotated 180 deg, depositing the cartons



Towmotor milk inverter, adapted for handling any type material

on the original upper pallet, and leaving the original lower pallet on the upper forks ready for the next load to be inverted. This Towmotor milk inverter is quickly interchangeable with standard Towmotor pallet forks.

## K-103—Multiple Ring Brake Drums

To combat the excessive frictional heat factor which causes brake drums on trucks and buses to "fade," drums to distort, linings to wear prematurely, and brake drums themselves to completely disintegrate, the Multi-Ring Brake Drum Corp. of Allison, Pa., comes forward with a multi-ring brake drum design having copper rings laminated with steel rings to form the braking surface of the drum. This multi-ring brake drum thereby combines the



Multi-Ring brake drum for heavy duty trucks and buses

high strength of steel along with the high conductivity of copper to lick failures found in conventional drums under high speeds, overloads, and mountain grades.

In operation, heat created on the braking surface is rapidly conducted between the steel rings and dissipated through the copper fins of the drum. At the same time the instantaneous heating of the copper rings gives a uniform heating to the steel rings which eliminates the internal stresses that are one of the main reasons for conventional brake drum failures. Ability of the individual rings in the multi-ring brake drum to expand and contract under excessive heats eliminates cracking. The rapid removal of heat from the brake drum surface itself is also a factor in eliminating heat check and cracking.

It is pointed out too that these laminated steel and copper rings bring about a self-aligning effect in respect to the contour of the brake lining. In contrast, the conventional rigid type drum having four machined surfaces, with tolerances, eventually results in excessive wear and heat generation to one side of the drum by not running concentric, states the company.

Another Multi-Ring factor for better wear and elimination of fatigue in the metal is heat equalization radially through the mass since the heat conductor runs from the brake surface outward. In contrast, when a conventional drum is heated by friction this heat will not go through the mass of steel or alloy fast enough to cause uniform expansion and contraction. In-

stead, the rapidly heating surface causes an expansion limited to a thin shell near the brake-lining surface only. Buckling results, and heat cracks.

The Multi-Ring brake drum is stated to overcome these conditions since heat equalization is conducted directly through the mass of steel for the full thickness of the brake drum. The copper rings are  $\frac{3}{8}$  in. by  $1\frac{3}{16}$  in. dead-soft sq edge Revere copper bar, in coils, circle-formed edgewise.

## K-104—Time Delay Valve

Production of a time delay valve said to operate on a new principle of air control, and brought out by Ross Operating Valve Co., Detroit, Mich., is designed to provide maximum dependability of air



Ross time delay valve

sequence valves. Unlike the old spring-pressure controlled valves, this Ross model operates by volume measurement of air. The use of regulated air assures constant repetition of time sequence.

The unit is available for all Ross inline operating bodies which range from  $\frac{1}{4}$  in. to  $1\frac{1}{4}$  in. in size, and is furnished in straightway, 3-way, normally open and normally closed models. It is especially adaptable for jigs, fixtures, machine tools, and other applications requiring a time sequence of two or more operations.



*Simple in design*

*Simple in operation*

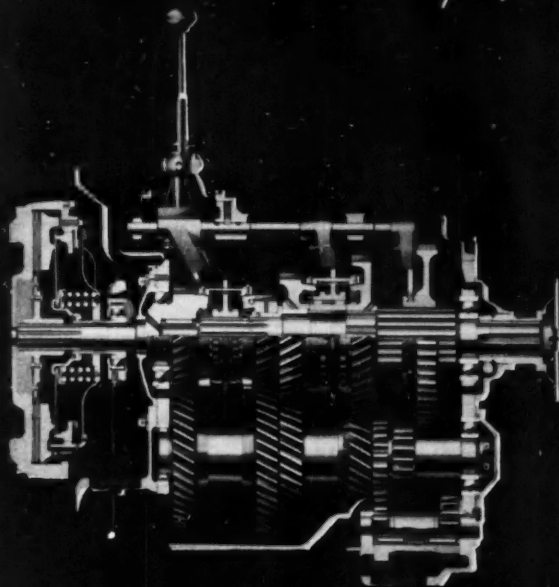


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# Willys Introduces F-Head Engine

(Continued from page 37)

of the higher ratio F-head engine.

This engine weighs only 21 lb more than the F-head model. Horsepower and torque are increased materially over the previous model (see specifications table). One of the principal advantages of this engine is its exceptionally flat torque curve which only drops to 107 lb ft (min.) at practically idling speeds.

The carburetor for this engine remains the same as before and is unchanged even in calibration.

Another of the interesting mechanical features of Willys two-wheel drive station wagons, Jeepster models, and panel delivery jobs is the Planadyne suspension which was given some refinement toward the end of the last model run. It incorporates a semi-elliptic, multiple-leaf spring mounted transversely at the front. Spring leaves have rubber inserts at their ends to control friction. An important refinement is the development of a double wrapped spring eye, the first leaf end

being wrapped around the lower knuckle pin for bearing, while the second leaf is wrapped more loosely to serve as a measure of safety.

From the standpoint of eye-appeal, exterior lines have been softened and streamlined. Although wheelbase remains unchanged, overall length has been increased by moving the center vertical line of the grille three in. forward and projecting the front bumper two in. forward. The "V" theme is carried out in the radiator grille, front fenders, and hood. The front edge of the hood is rolled under and even the distinctive front fenders have been changed in appearance. At the same time the rear wheel opening of the station wagon has been lowered and reshaped to conform with the horizontal lines of the vehicle. As a measure of added safety the rear bumper on station wagons is wrapped around the sides to protect rear fenders. Another improvement in station wagons is in the provision of a fold-down back on the driver's side to facilitate loading and unloading from either door.

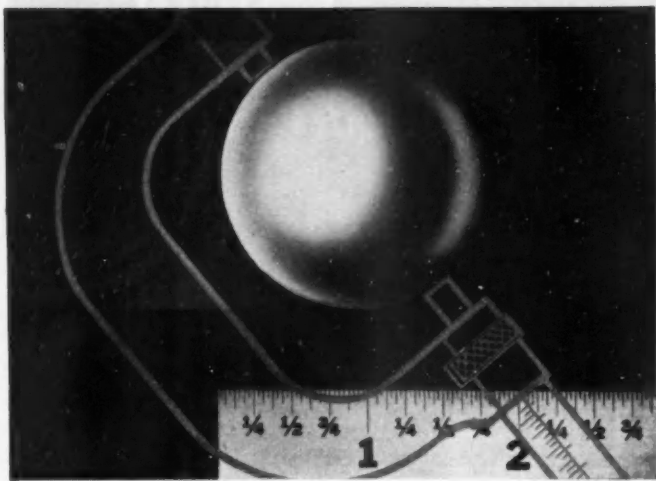
Some important changes have been made in the Jeepster to increase its utility. For one thing Vinylite side curtains now are supplied to permit folding without injury. Although the top is still actuated manually, its action has been greatly simplified by the addition of a new system of counter-balanced springs which permits raising and lowering with practically fingertip control.

Instrument panels also have been improved by the use of new instruments clustered in such fashion as to promote quick viewing.

Low pressure tires are used on the restyled models, tire size on the station wagon being 6.70-15; on the Jeepsters —6.40-15 in.

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Largest Independent and Exclusive Metal Ball Manufacturer

## Men of the Industry

(Continued from page 25)

The National Screw & Manfg. Co.—The appointment of **George F. Jenkins** as Sales Manager of the company has been announced.

Lockheed Aircraft Corp.—**J. W. Clutter** has been named General Sales Manager.

Aerol Co., Inc.—The appointment of **Frank Gaines** as Director of Sales, has been made.

Pittsburgh Plate Glass Co.—**Robert Wardrop** has been appointed Asst. to the Vice-President.

Clayton Manufacturing Co.—Announcement is made of the appointment of **William O. Merritt** as Sales Promotion Manager.

Industrial Tape Corp.—**Walter M. Cramp** has been appointed Advertising and Sales Promotion Manager.



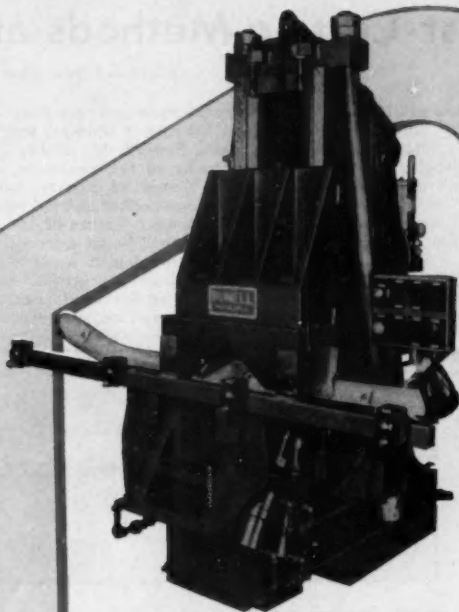
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## SPECIAL MACHINES

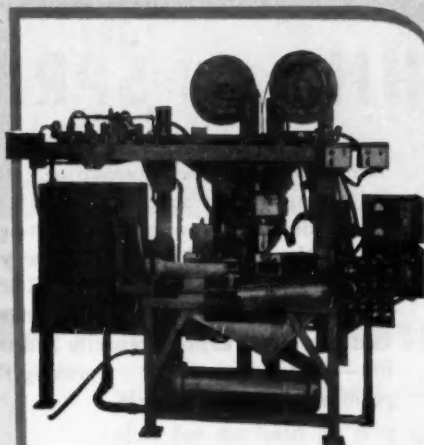
**RIVETING MACHINE.** This Bunell Special Machine completes 300 automobile bumper face bars an hour, riveting the center face bar section to the two outer sections. The three sections are automatically positioned by the ram, which acts as a back-up for the rivets. Three hydraulic riveting hammers on each side cold squeeze the heads on six rivets simultaneously. Operation is completely automatic . . . or separate machine functions can be controlled individually.

● You can drop your unit costs to rock-bottom levels with Bunell Special Machines—ruggedly built for accurate, efficient operation. Our competent engineering staff, skilled personnel, and modern, complete plant are at your service. Let us help with your production problems. Write today!

**WELDING MACHINE.** One supporting clip is welded to each right and left hand automobile bumper face bar section by this Bunell Special Machine—which produces 300 pieces an hour. Automatic welding heads weld two sides of the clip to the face bar. While one section and clip are being welded, the opposite section and clip are loaded, so that operation can be continuous. Operation of each side of the machine is completely automatic. A flux recovery unit is included.



RIVETING MACHINE



WELDING MACHINE



WRITE FOR CATALOG  
describing BUNELL facilities,  
methods and equipment.



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# Cost-Cutting Methods at Engineers Show

(Continued from page 48)

handling features, will be shown. Welding and brazing will be represented with the latest equipment and techniques. A balancing machine with unique photoelectric controls will be displayed. No less than 10 oil companies have taken space at the show to exhibit lubricants, cutting oils, and coolants.

The Society's National Program Committee has planned 18 technical sessions to be held during the five days. These

sessions are under the direction of Fred J. Schmitt of Chicago, program chairman, Kenneth W. Riddle, Philadelphia member of the committee, and Frank W. Wilson of Society headquarters, Handbook editor and technical director.

A special feature of the week's activities will be an economic conference on the evening of April 10 when four of the leading practical economists of the United States will meet to present and discuss their respective viewpoints

as to our present economic situation and the outlook for the future. The session is sponsored cooperatively by a Committee of Publishers under the chairmanship of Joseph S. Hildreth, president of the Chilton Co., Philadelphia, and by the American Society of Tool Engineers. The four economists are Dr. Edwin G. Nourse, formerly chairman of the Council of Economic Advisers to the President and a founder of the Brookings Institution; Dr. C. Canby Balderston, Dean of the Wharton School of Finance and Commerce and an outstanding authority on industrial relations; Edward T. Cheyfitz, labor economist and member of the National Executive Board of the CIO; and Joseph A. Livingston, business economist and formerly economic assistant to the Chief, Office of War Mobilization and Reconversion.

An introductory address by Walter D. Fuller, president of Curtis Publishing Co. and Vice-Chairman of the Committee for Economic Development, will precede the actual Forum. Robert B. Douglas, president of the ASTE, will open the meeting, and Paul Wooton, president of the Society of Business Magazine Editors and secretary-treasurer of the White House Correspondents' Association, will introduce the speakers.

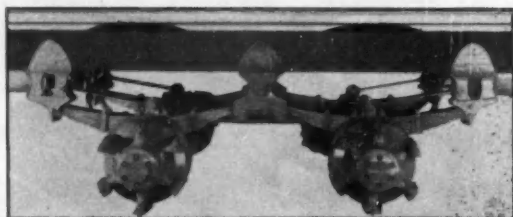
Chapter representatives will meet in the House of Delegates during the morning of Thursday, April 13, to elect a board of directors. During the same day, the incumbent board will congregate to elect national officers and to transact other business. The Society's annual banquet and national meeting will be held during the evening.

A number of local manufacturers will open their plants to the ASTE during the Exposition so that some of the methods and processes displayed or discussed may be seen in operation. Among these plants are those of Baldwin Locomotive Wks., the Budd Co., Link-Belt Co., SKF Industries, Inc., Westinghouse Electric Corp., Yale & Towne Mfg. Co., Radio Corp. of America, Philco Corp. and Crown Can Co.

Many of the new products which will be on display at the Exposition are described and illustrated in a special section of this issue of **AUTOMOTIVE INDUSTRIES**.

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AXLE  
UNIT**

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*Regularly and Thoroughly*





## ***TRI* CLAD** MOTORS

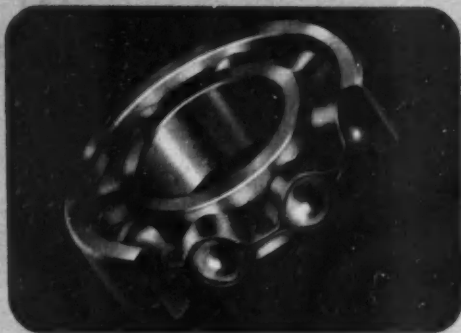
REG. U.S. PAT. OFF.

will run safely without relubrication for as long as any general-purpose motor you can buy—

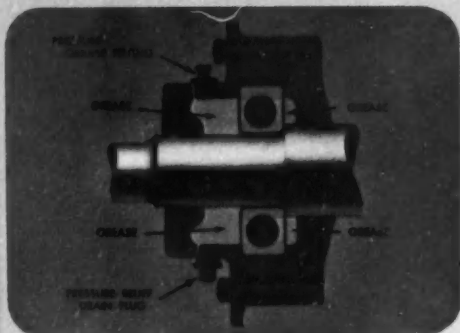
**and** if the application makes relubrication a must, you can grease a ***TRI* CLAD** without halting production

GENERAL  ELECTRIC

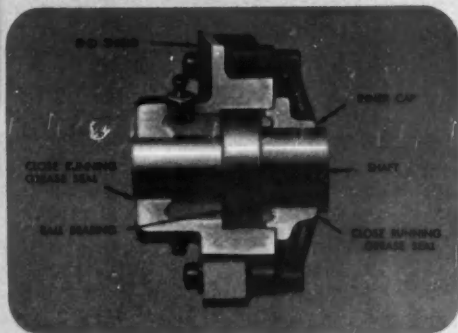
HERE'S  
WHY



- 1 **EXTRA BEARING PROTECTION** — Tri-Clad gives you extra bearing protection because heaviest standard-service bearings are carefully selected to withstand severe loads for long periods.



- 2 **EXTRA GREASE** — Four times the ordinary amount of grease is packed into the large Tri-Clad grease reservoir. Since bearing life depends on grease, this means that Tri-Clad motors will run safely for years — for as long as any general-purpose motor you can buy.



- 3 **SEALED-IN BEARINGS** — Bearings and grease are completely sealed in a cast housing with long running seals for extra protection from dirt, dust, and lubricant leakage.

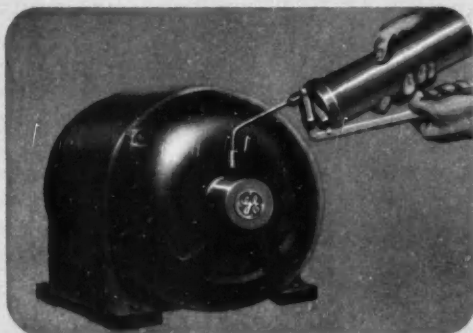
**TRI-CLAD** MOTORS will run safely without relubrication for as long as any general-purpose motor you can buy—

Tri-Clad extra lubrication "protection" can save you money because:

1. Tri-Clad's oversize grease reservoir and the heaviest standard-service bearings mean you do not have to bother with greasing between motor check-ups.
2. When relubrication is needed on those tough applications, you can grease a Tri-Clad without interrupting production-line operations.

Tri-Clads are grease-gun easy to lubricate on the job. Moreover, a Tri-Clad motor will run safely where an ordinary motor would fail. Chances are you'll be spared the cost of a "special" motor.

**YOU BE THE JUDGE!** The best way to prove to yourself that Tri-Clad gives you the most for your motor dollar is to contact your local G-E office. Tri-Clad stocks are complete. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

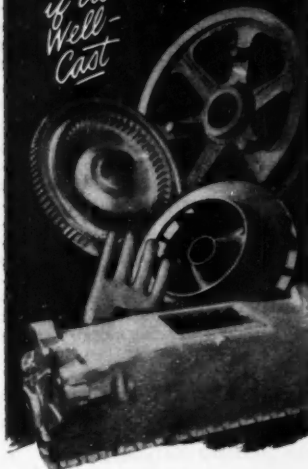


- 4 **PRESSURE-RELIEF GREASING** — An efficient system of pressure-relief lubrication (with standard fittings) enables a Tri-Clad motor to be quickly and easily greased on the job when and if it's needed.

GENERAL  ELECTRIC

## A Light Casting Is the Right Casting

*if it's  
Well-Cast*



THE right casting for you might be an aircraft part, a rubber goods part, textile machinery, automotive, portable tool application, implement, or vacuum cleaner part.

The right casting might well be a light casting.

There are several good reasons why it will be right if it's Well-Cast, in either aluminum, magnesium or bronze:

- Our 40 years experience
- 3 complete plants
- A national reputation for good service
- The economy-in-use of light metals
- A long list of satisfied customers
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Let's hear from you. Tell us your problem and we'll tell you whether a light casting is the right casting. Catalog No. 50 on request.

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Bronze & Aluminum Co.

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CLEVELAND 4, OHIO

Automotive Industries, April 1, 1950

*What's  
New at the ASTE Exposition*

For additional information please  
use coupon on page 56

(Continued from page 55)

joints by following a simple procedure not requiring skilled operators. The other station will show how use of a simple production set-up facilitates production of parts on an indexing table and gas heated in a few seconds.

Booth 215

### ASTE-33—Air Control Valves

A working exhibit of a complete line of directional air control valves for users of compressed air operated equipment is featured in the display by Hannifin Corp., Chicago, Ill. These valves include the recently announced Type NH (hand operated) and Type NF (foot operated) valves embodying the company's pilot controlled, piston operated disk type design; the new Type NE "Directair" push button controlled electric valve, the Type P-25 hand operated valve, and the Type MK manifold valve.

Also included as a working part of this exhibit will be the new Hannifin "Micrometric" speed control valve for air cylinders and the new Hannifin "Air Warden" air conditioning unit consisting of filter, pressure regulator, and lubricator for use on all kinds of air operated equipment.

Besides the valve and cylinder exhibit, Hannifin will have on display its newest, small, air-operated press, the 1/4-ton Han-D-Press (Model M-1) set up for actual operation with one of the new Type NF foot valves. It is especially applicable to press fit assembly operations, such as in the manufacture of electric motors, small tools, and bearing parts, and to staking operations. It is also suitable for light stamping, marking, and die cutting operations.

In the field of hydraulic equipment, Hannifin will exhibit a number of models of its improved hydraulic cylinders.

Booth 636

### ASTE-34—Automatic Gaging Machines

Occupying space where the two main aisles cross in the center of the Convention Hall, Sheffield Corp. of Dayton, Ohio, will feature their newly developed, fully automatic gaging machines designed and built for large automobile manufacturers. There will also be a variety of new applications of air

(Turn to page 72, please)

## You can work them harder...



## ...but don't make them sweat\*

Molybdenum high speed steels are in many ways superior in performance to the equivalent tungsten steels, the main difference between them being that they require a somewhat different heat treatment.

Hardening temperatures are lower—operating costs are reduced—fuel is saved—furnaces and baths last longer and require fewer repairs.

### MOLYBDENUM HIGH SPEED STEELS

★ Many toolhardeners judge the correct high-heat hardening temperature for tungsten (18-4-1) high speed steels by the appearance of 'sweat' on the surface. This rough and ready test is not applicable to Molybdenum high speed steels, which harden at lower temperatures. Our free booklet gives full information on heat treatment.

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## SAE Detroit Meeting

(Continued from page 45)

of double vision which could be quite confusing to the driver. According to the author, the limit of curvature is in the region of a 20-in. radius. Anything less than this will aggravate double vision effects.

### Brakes and Suspension Systems

The suspension symposium as well as the session on passenger car brake developments drew large audiences and contributed to the knowledge on these

subjects. Considerable interest was exhibited in the discussion of the disk type brake recently introduced by Chrysler. W. R. Rodger admitted that in its present form the disk brake is too expensive to merit consideration for mass-produced cars. But he mentioned that simpler and less costly designs are undergoing experimental testing and give promise of meeting the requirements of lower priced cars. From an engineering standpoint, Chrysler feels

the disk brake has certain advantages over conventional designs, as developed in the author's paper.

### Engine Design and Performance

Prof. W. E. Lay made an extremely interesting contribution on the fundamentals of internal combustion engine design and performance, supplemented by a simple analysis and simple calculations which should add much to the literature. Students and practitioners alike will profit by a reading of his paper.

### What Industry Stands For

Closing the three-day meeting, the banquet speaker, Del S. Harder, vice-pres., Ford Motor Co., presented his thesis that the responsibility of all people concerned with industry is to increase efforts to achieve lower production costs; to earn and maintain the confidence and cooperation of the employees; and to help bring about a better understanding among employees and the public of what industry stands for and how it operates.

### Jettings Around the Production Panels

One major feature of the Production Clinic was the practical nature of problems presented for consideration. As one example, at the Materials Handling panel a forging supplier brought up a problem in connection with palletized shipments. Using standard pallets, the supplier and his customers can readily handle the material with their low lift fork trucks. However, in many cases, the common carrier transferred loads from one vehicle to another at a basing point. At this point the system of pallet handling went haywire because the common carrier had old fork trucks incapable of reaching under the low pallet. As a result the pallets were beaten out of shape and usually useless at the customer's end. It was agreed that all parties having a common interest in this problem should get together with the common carriers to assure the installation of new fork truck equipment at the terminals and distribution points.

Discussion of surface finish has now reached the stage of standardization of specifications, of instruments, and of methods. It was reported that ASA sub-committee B46 was in the process of reorganization to accomplish these ends. Mention was made that the GMR, gold standard, geometrically ruled specimen blocks announced last year could be used profitably for checking and calibrating surface finish measuring instruments.

That preventive maintenance of plant equipment must be slanted at preventing machine break-down was emphasized by representatives of large companies. Reports were given of practice which specifies the periods when each type of equipment must be inspected and overhauled if necessary. And this has eliminated much of the down-

(Turn to page 70, please)

## BALLS FOR BEARINGS AND OTHER BALL APPLICATIONS



Precision balls made for your job — available in a variety of materials. Your specifications will receive prompt attention in our Engineering Department. We are thoroughly experienced in supplying the automotive industry with special bearings, retainers and balls. Let us give you our recommendations.

## THE HARTFORD STEEL BALL CO. HARTFORD 6, CONN.

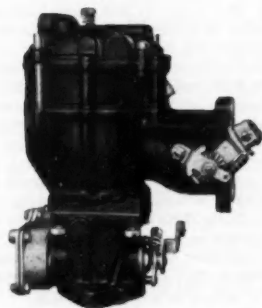
DETROIT W. S. JOURNAL 442 NEW CENTER BLDG.	CHICAGO VICTOR H. CLARK 203 W. WASHINGTON BLDG.	NEWARK, N. J. GUARANTEED TRUST BLDG. 972 BRAD ST.	LOS ANGELES, CAL. E. D. MALLORY CO. 1718 SOUTH FLOWER ST.	EXPORT K. A. RODRIGUEZ, INC. 35 W. 47th ST. NEW YORK.
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## is the Engineers' Choice!



Only the men who daily handle heavy-duty equipment know the *full* meaning of Zenith performance—for they experience firsthand the smooth, fast acceleration, the strong idling and freedom from stalling, the obedient response to their demands for power and speed that make Zenith the finest performing carburetor in its field. These men have added final proof to the engineers' conviction that Zenith's rigid construction and high manufacturing standards mean truly superior performance *on the job*. For *your* heavy-duty equipment, make the choice experience demands—Zenith—first with experienced engineers for quality performance.

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time usually experienced in large plants. It was also emphasized that the keeping of records on all items of equipment, showing down time and frequency of repairs makes for an excellent means of judging when a machine has outlived its usefulness and should be replaced.

All of the panels were well attended and provided an excellent opportunity for an exchange of valuable information.

#### New Developments—Gleaned At the Meeting

The Crane Co., of Chicago, will short-

ly introduce a rather startling innovation in foundry practice. They have recently developed a method of sand handling and distribution by means of a pneumatic system in which the sand, from the central station, is delivered to molding machines by means of piping. This is said to simplify sand handling materially, to reduce maintenance problems, and reduce installation expense. In its own foundry, Crane substituted an experimental pneumatic installation costing \$6000 for the conveyor installation which cost \$22,000.

A consulting engineer in Detroit is developing a striking technique for ma-

chining the hard-to-machine materials. For drilling and tapping stainless steel, Armo iron, Swedish iron, and other metals usually difficult to machine, he directs a stream of compressed CO<sub>2</sub> onto the working surface. As it issues from a small copper tube the stream of gas expands and immediately solidifies, super-cooling the working area. One qualified observer tells us that drilling and tapping become ridiculously simple with this technique.

## 80 Olds an Hour

(Continued from page 44)

Here is the answer to your Spring Problems!

A Handbook on Springs free for the asking

If you are designing or making a product requiring a spring in its assembly, you will want this book—a 28-page handbook of engineering data on springs—28 pages of formulas, graphs, charts, tables and drawings. This book will tell you all you need to know about specifying springs of any type from light wire to heavy elliptic leaf springs. It's yours for the asking—write for your copy today.

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H. K. PORTER COMPANY, Inc.  
PITTSBURGH, PA.

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to warm up prior to final precision adjustments. Instead of being driven off the line to the dynamometer stand for final testing, the assembled car is picked up by a cross conveyor and is transferred to one of the test stations automatically. Only at this point does a mechanic enter the car and drive it a few feet onto the dynamometer to put it through its paces.

Nor is this the whole story. When the test cycle is completed and the car has been inspected, it is driven off the dynamometer onto another cross transfer conveyor and automatically transferred to the final inspection line. Again the transfer is made without manual effort or employment of a driver.

Final inspection naturally involves some repairs and paint touch-up and these are expedited on separate lines. For example, each paint line is arranged in two sections, one for repair of undercoats, another for finish coats. Each of the lines has two large infrared lamp tunnels for drying. Four large infra-red tunnels are found here, each one 66 ft in length, the battery using about 5000 lamps with gold reflectors.

Mounted off the ceiling in this department is an unusually long infrared tunnel through which the wheel conveyor moves for drying wheel paint. This tunnel is 136 ft in length.

Inter-relation of conveyors—no matter what their function—is the responsibility of the master control room. Here all of the conveyors are synchronized together by means of an electronic control panel. The final criterion governing the operation of these conveyors is a calibration in terms of cars per hour rather than conveyor speeds. If a change in speed of a major assembly line must be made, the speed of all other conveyors is correspondingly adjusted by electronic equipment.

Because of the variety of conveyors involved in this process, Oldsmobile has built an enormous panel board on which each conveyor appears in the form of a metal strip made to scale and in proper relation to the building layout. These strips are outlined with signal lamps so as to transmit to the control operator an instantaneous visual message. If everything is going

(Turn to page 72, please)



## This Exide Battery is cranking thousands of your engines, Mr. Diesel

When your engines first came into general use, Mr. Diesel, its high compression ratio made cranking a major problem. Exide engineers solved it by building a battery designed specifically for the job.

To engine builders . . . and manufacturers of Diesel-powered equipment . . . and users of Diesel engines . . . this means: When an Exide does the cranking, your engines **START**.

You can count on a *quick breakaway, high cranking speeds, low voltage drop*.

You can count on trouble-free performance . . . in rugged service . . . in all climates.

You can count on long battery life and low cost maintenance . . . proved daily in buses,

trucks, trailer tractors, off-the-highway equipment, ships, power plants, Diesel-electric locomotives.

For dependable service at a saving, use Exide Diesel-cranking Batteries.

THE ELECTRIC STORAGE BATTERY COMPANY  
Philadelphia 32  
*Exide Batteries of Canada, Limited, Toronto*

### WHATEVER YOUR CRANKING PROBLEMS

Exide's Research Staff—the largest in the industry—is ready to put its vast experience to work for you.

"Exide" Reg. Trade-mark U. S. Pat. Off.

**1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950**



"His Lordship refuses to walk the plank unless we put slip-resistant 4-WAY Safety Plate on it."

For greater safety under foot,  
in your plant and on your products

# Inland 4-Way Safety Plate



**Firesafe**



**Safe Footing**



**Easy To Fabricate**



**Easy Assembly**



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New Bulletin with New  
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FI. Complete engineering  
and application data.  
Send for it!

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smoothly, the signal lights are off. If a conveyor is stopped or goes out of commission for any reason, a signal light will show on the board—green if the line has been shut down and amber if it is overloaded.

To supplement the master control board, key departments are provided with a simple signal board showing the conveyors in that department. This makes it possible for the superintendent or foreman to spot trouble within his jurisdiction as it happens.

*What's New* at the **ASTE Exposition**

For additional information please  
use coupon on page 56

(Continued from page 67)

gages. The Murchey Division of Sheffield will have an exhibit of Murchey die heads and thread chasers. Another portion of the exhibit will be devoted to typical examples of latest developments in crush-true grinding.

## Booth 330 ASTE-35—Machine Tool Auxiliary Device



A machine tool auxiliary, Versa-Mil, for milling, drilling, and grinding will be displayed by Versa-Mil Co., New York, N. Y. This unit can be used with engine and turret lathes, planers, boring mills, and milling machines. It can also be used independent of other machine tools to do machining in place on heavy equipment. The basic unit utilizes a 1/2 or 3/4-hp motor, has 13 spindle speeds ranging from 44 to 450 rpm, and weighs 29 to 104-lb depending on the motor.

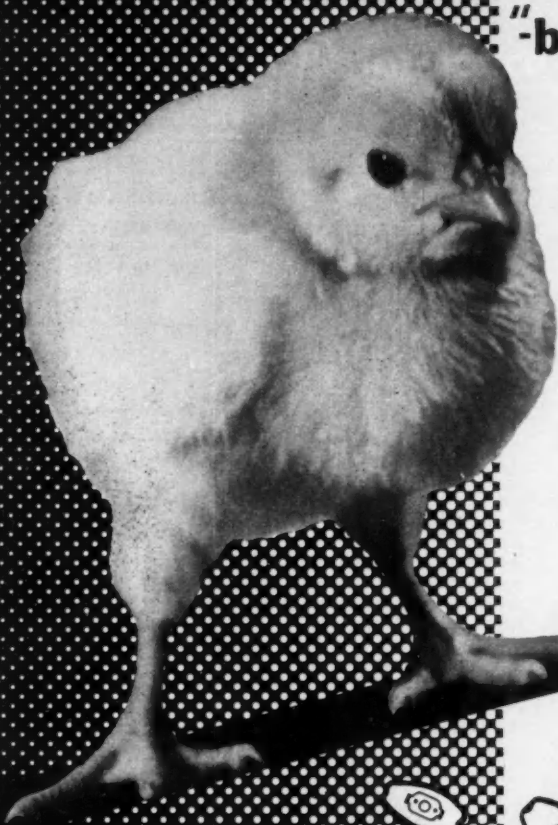
## Booth 565 ASTE-36—Metal Cleaning Products

Oakite Products, Inc., New York, in featuring recent additions to their line of metalcleaning and allied materials will display Oakite Compound No. 33, an acid-type cleaner and surface-conditioner for ferrous metals and aluminum; Oakite Composition No. 38, which forms a dense foam-blanket on pickling solutions to prevent the escape of acid fumes; Oakite Composition No. 91 and 91-A which, when used together, are reported to improve electrocleaning of

(Turn to page 74, please)

**AUTOMOTIVE INDUSTRIES, April 1, 1950**





**"-but my order  
is only  
chicken  
feed"....**

Not to us! Small orders for springs, samples, or experimental lots are made in special departments equipped through experience for just such service. Go to one of the plants below, when you need springs, in any amount.



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U. S. DIVISIONS OF  
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AND CANADIAN AFFILIATE



# What is New at the ASTE Exposition

(Continued from page 72)

brass and copper; Oakite Composition No. 90, an electrocleaner for steel; Oakite Composition No. 97, an emulsifiable solvent for use in automatic washing machines to pre-clean steel, cast iron,

brass, aluminum and zinc before electroplating or pre-paint treatment or between processing operations; Oakite Pickle Control No. 3, a specially designed inhibitor for pickling solutions that prevents waste of acid after scale or rust is dissolved; Oakite Compound

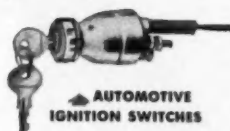
For additional information regarding any of these items, please use coupon on page 56

No. 36, an acidic cleaner for tank-conditioning of metals for paint; and Oakite Crysoat No. 87, for low-cost pre-paint conditioning of iron, steel, zinc, aluminum and copper alloys in mechanical washing machines.

## DEPEND ON *Mitchell* FOR THESE SPECIALIZED PRODUCTS

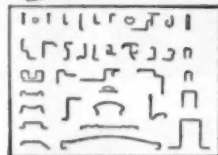
- Ignition switches
- Turn signal switches
- Rolled shapes

Mitchell ignition switches, turn signal switches and rolled shapes meet the most exacting specifications of the automotive industry for quality and excellence of design. You will find these Mitchell products widely used by leading manufacturers of cars, trucks, buses and tractors.



**AUTOMOTIVE  
IGNITION SWITCHES**

Installed as original equipment on many popular-make motor cars, trucks and buses, Mitchell ignition switches are known for their sturdy construction and extra long life. "Radio" position available without extra cost.



Mitchell clamp-on and screw type semi-automatic turn signal switch for trucks, cars, buses, tractors.



Mitchell 6-wire concentric type semi-automatic turn signal switch used in passenger cars.

➤ **TURN SIGNAL SWITCHES**—Mitchell semi-automatic, self-cancelling turn signal switch affords motorists an easy, positive method of indicating right or left turns—gives pedestrians and approaching and following vehicles accurate, fully visible turning information.

➤ **ROLLED SHAPES**—Mitchell offers a complete range of metals, designs and gauges in stainless steel, aluminum, brass, bronze, copper; cold rolled, drawn and pressed for automobiles, airplanes, architectural requirements, railroad cars, radios, television receivers, all industrial uses.

Our sales engineers work with you in the application of Mitchell products to your specific designs. Call on us at any time.

### UNITED SPECIALTIES COMPANY

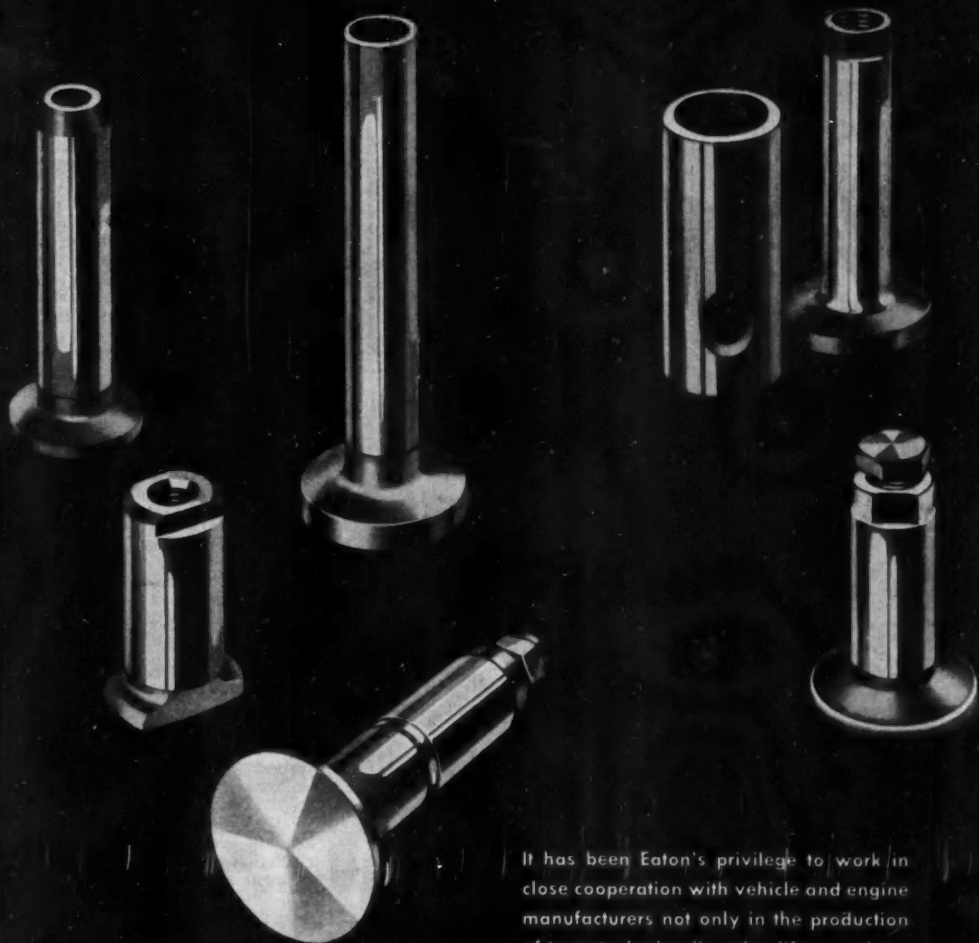
MITCHELL DIVISION • PHILADELPHIA 36  
IGNITION AND TURN SIGNAL SWITCHES • ROLLED SHAPES • DOVETAILS  
UNITED AIR CLEANER DIVISION • CHICAGO 28  
AIR CLEANERS • METAL STAMPINGS

## Other New SHOW Products

Other New Products at the Show which appeared in recent issues of AUTOMOTIVE INDUSTRIES are listed as follows:

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Allegheny Ludlum Steel Corp.		618
B-47 Hot Work Steel, page 72	2-15-50	
Allen Mfg. Co.		824
Dryseal hex socket pipe plugs, page 50	6-1-49	
American Pullmax Co., Inc.		968
Plate Cutting Machine, page 56	1-1-50	
Bruning Co., Charles		801
Whiteprinter, Model 50, page 47	11-1-49	
Perspect-O-Metric, page 49	6-1-49	
Equipoise Machine, page 51	10-1-49	
Carboloy Company, Inc.		786
Live spiral masonry drill, page 62	2-15-50	
Cleveland Industrial Tool Corp.		16
Cleco Hydraulic diamond turner, Model 1002-A, page 67	2-15-50	
Colonial Broach Co.		1021
Redesigned broaching machines, page 47	2-1-50	
Denison Engineering Co.		
Strip Feed Accessory, page 50	6-15-49	1032
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Pant-O-Scriber die checker, page 45	11-1-49	
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Ingersoll Milling Machine Co.		950
Shear Clear close-blade face mill with inserted carbide-tipped blades, page 30	8-15-49	
Lipe-Rollway Corp.		115
Automatic Magazine Loading Bar Feed, page 47	10-15-49	
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Internal gear cutting machine, Shear-Speed, page 47	2-1-50	
Oakite Products, Inc.		565
Oakite Compound No. 32, page 60	9-15-49	
Oakite Compound No. 97, page 58	5-15-48	
Pratt & Whitney		815
Di-Bur, page 56	2-1-50	
Flexible Shaft Machine, page 46	11-15-49	
Wheelforming Attachment, page 50	8-1-49	
V & O Press Co.		764
Feed-O-Matic punch press feeding device, page 47	10-15-49	
Watson-Flagg Machine Co., Inc.		1142
Heavy duty thread roller, Model C, page 49	2-15-49	

## EATON TAPPETS— for Maximum Performance and Service Life



**EATON**

It has been Eaton's privilege to work in close cooperation with vehicle and engine manufacturers not only in the production of tappets, hydraulic valve lifters, valves, and other precision engine parts, but also in the design and development of parts which have contributed to improved performance and longer life for internal combustion engines in every field of service.

# Making Rotors and Turbine Wheels

(Continued from page 39)

is  $\frac{1}{8}$  in. narrower while the outer diameter remains unchanged. The turbine buckets were lengthened by  $\frac{1}{4}$  in. thus increasing the volume handled in the annulus. Turbine buckets now are assembled with a sliding fit in the turbine wheel dovetails and are pinned securely in place through small holes drilled in the rim through each dovetail. This procedure which replaces the former method of side peening the buckets, has

achieved a reduction in cost and has eliminated a prolific cause for engine overhaul.

One of the elements contributing to weight reduction is found in the integrally-cut cooling vanes, formerly a part of the forging, thus permitting the change in web profile. In the new design the vanes are milled in a light dished forging which is machined overall and fitted over the wheel.

The compressor rotor, of single stage centrifugal type, is an aluminum alloy forging. Formerly it was machined all over, the vanes being machined straight initially, then bent individually at the inlet edge in a special machine. The newly introduced rotor has fewer vanes and is considerably shorter in length by virtue of a three-piece construction in which two separate guide vane sections—one on each side—are bolted through the main impeller. These changes have improved the quality of the compressor element, reduced weight, increased efficiency, and yet have increased airflow capacity by 20 per cent.

One of the most impressive operations on the turbine wheel is the surface broaching of the 54 turbine bucket dovetails from the solid rim. What makes the job more difficult than appears on the surface is that the wheel is of a special alloy having relatively poor machinability. As a matter of fact when the operation was first started—during the war—it was necessary to resort to the use of carbon-tetrachloride as a cutting fluid despite its high volatility and other undesirable qualities. They finally found a specific type of commercial cutting fluid—"Sul-Tran"—that has been successful in this particular application.

Broaching requires three different machine operations. First the wheel goes to an American H-15-60 horizontal broaching machine to cut two starting slots in the periphery of the rim, using a set of two broaches. Two cuts are taken with the first broach and one cut with the second, the latter deepening one of the slots previously cut. The second operation takes place in a big American SB-15-66 vertical surface broaching machine fitted with a three-stage broaching tool. The wheel is so fitted in the fixture as to present the shallower of the two prepared slots at the center broach, the deeper slot being at the right-hand broaching tool. As the three-stage broach moves into the work, the left-hand tool cuts a shallow slot, the center tool cuts deeper, while the right-hand tool finishes to full depth and form. The fixture then automatically indexes one tooth at a time until the 54 slots have been completed.

The third machine, of the same type as the second, has one broaching tool which cuts the dovetail to precise size and form and at the same time produces the serrations for the buckets.

One of the unusually difficult fabrication jobs developed here is the set-up for welding the special alloy turbine wheel to the shaft, the latter being of SAE 4140 alloy steel, heat treated. The job is done in a big Taylor-Winfield butt welder, the work station being illustrated here.

(Turn to page 78, please)



## Highest stabilized degreasing solvent —Stabilized NOT Alkalized

Years of research and development have produced this outstanding new BLACOSOLV. This new product has been subjected to the most rigorous stability tests for the most difficult jobs. Contains no alkaline materials which neutralize acid after breakdown. The new stabilizers prevent solvent breakdown and possible acid formation.

The new BLACOSOLV will degrease scientifically all metals or combinations of metals. You need not pay premium prices for special solvents for different metals. Blacosolv can be used over and over without impairing its high qualities.

ONE  
PRICE FOR ALL  
METALS OR  
COMBINATION  
OF METALS!



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(TUBING SPECIALTIES DIVISION)

COLUMBIA STEEL COMPANY, SAN FRANCISCO  
PACIFIC COAST DISTRIBUTORS

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

# SHELBY SEAMLESS TUBING

NATIONAL TUBE COMPANY BULLETIN NUMBER 17



## Shelby Seamless Steel Tubing

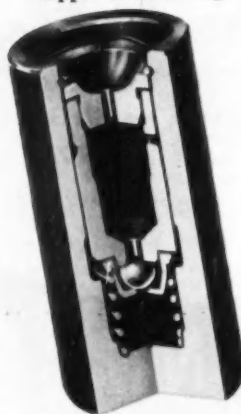
UNITED STATES STEEL





# STOP Tappet Noise with HYDRAULIC VALVE LIFTERS

Use Hydraulic Valve Lifters in your engine to put a stop to tappet noise and gain these five additional advantages . . .



1. Elimination of valve clearance adjustments.
2. Longer valve life.
3. Smoother engine performance.
4. Absorption of cam tolerances and runouts.
5. Automatic compensation for expansion and contraction of engine parts.

Let us tailor a Hydraulic Valve Lifter to your present or future automobile or truck engine design. Our current production rate is more than sixty-five thousand units a day.

Read the complete story of our Hydraulic Valve Lifters in this bulletin designed especially to inform automotive executives.



## DIESEL EQUIPMENT DIVISION

General Motors Corporation  
GRAND RAPIDS, MICHIGAN

In butt welding the machine goes through three continuous cycles automatically. The turbine wheel and shaft first are positioned in the fixture and automatically clamped. As the ends make contact an electric current of about 60,000 amp is impressed on the joint, this extremely high amperage being required to produce rapidly the temperature of 2600 F at which both metals are in plastic state.

At this point the machine cycle brings into play horizontal hydraulic pressure of 240,000 lb which is required to upset the joint and thus produce an integral weld in the dissimilar metals. This cycle occurs during the last four seconds of the three-minute cycle required to complete the welding operation.

The compressor rotor, the second major element redesigned for the new J33 Allison engine, is an aluminum alloy forging having less vanes than the original version. The variety of turning and boring operations required on this part is done on a battery of the familiar Bullard V-T-L machines with follower attachments, using cemented-carbide tools. The more unusual operations are those concerned with the finishing of the vanes and the web.

The initial stage of machining between the vanes and finishing the web to specified thickness and taper is done in a large Cincinnati milling machine fitted with an automatic rotary indexing fixture. This fixture is arranged to tilt so as to present the web surface on each side—in separate settings—normal to the cutter. For milling they use a unique 12-tooth cutter tipped with cemented carbide. The cutter runs at about 480 rpm with a feed of nine ipm.

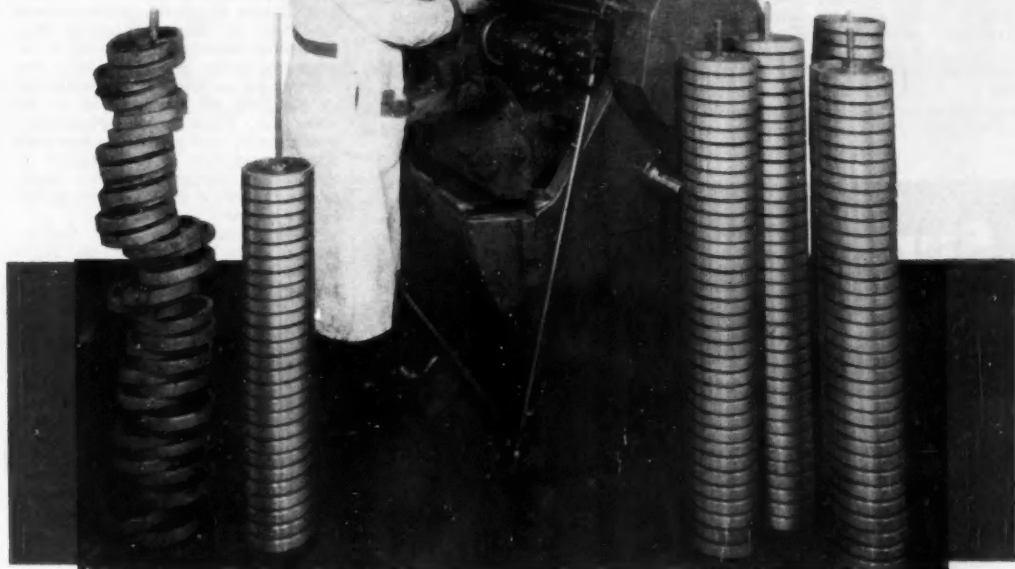
The next milling operation—straddle-milling of the vanes—is done in another of the big Cincinnati mills. Here they use a special type of cutter having only three large teeth, cutting speed and feed being adjusted to the maximum value.

The final operation on the vanes is done in a battery of new Sundstrand two-head milling machines. One head straddle-mills at the lower edge of the vanes to produce an angular formation, while the second station mills one side of the vanes to establish the front and rear mounting position of the rotor. It may be noted that since the rotor takes the same operations on both sides, the preceding steps are done on each side in turn.

With the new rotor the hand burring and polishing operations are much simpler than before and the vapor blasting formerly used is no longer required. Similarly the adoption of separable guide vane sections, called inducers, also eliminates the time consuming procedure of bending the vanes at the tips, a procedure necessary with the former one-piece rotor construction.



6.8" dia. High Ten. Iron  
Gear Blanks turned to  $\pm$   
.001" to  $\pm$ .0005". 55 per  
hour.



## The Baird 76H Chucking Machine Has Versatility

combines turning, drilling, tapping, threading, milling and other operations.

Some of the EXCLUSIVE FEATURES, which have made  
the Baird 7 Six-Spindle Horizontal Indexing Lathes outstanding are:

★ **INDEPENDENT TOOL SLIDES**

The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.

★ **DIFFERENT SPEEDS AT SPINDLES**

Ability to choose a speed for the spindle at each work station to suit the operation to be performed at the station permits the best product in least time.

★ **AUTOMATIC CHUCKING**

Operator has both hands free to handle the work.

No levers or handles to require his attention or take his time.

★ **ATTACHMENTS**

Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.

★ **AUTOMATIC MECHANICAL STOP**

Stops machine at end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage, and for greatest safety.

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OTHER BAIRD MACHINES: MULTIPLE SPINDLE GRINDERS, WIRE FORMING MACHINES, PRESSES, TUMBLING EQUIPMENT

**THE BAIRD MACHINE COMPANY**  
FRAITFORD, CONN.

## New Diesel Under 5 Lb/Hp

(Continued from page 32)

by studying the best angle for the throat of this combustion chamber to insure that the piston head does not become unduly hot in the vicinity of the throat and that carbon deposits do not build up rapidly around the piston rings. Experience with gas turbine blading has directed them in their choice of high chromium steels for the hot plug. The precombustion chamber is in two parts, the top half carrying the injectors while the lower part serves as

the hot plug. They are held together and to the cylinder head by three studs and sealed by copper washers. The precombustion chamber is spherical and is connected to the main combustion chamber by a throat which directs the charge into the recesses in the piston head.

Practically all drives and accessories are at the front of the engine. Bevel gears are used for driving the two overhead camshafts. There are two fuel

delivery pumps and one fuel filter, and in the lowest part of the rear-end assembly are the oil scavenger and oil pressure pumps.

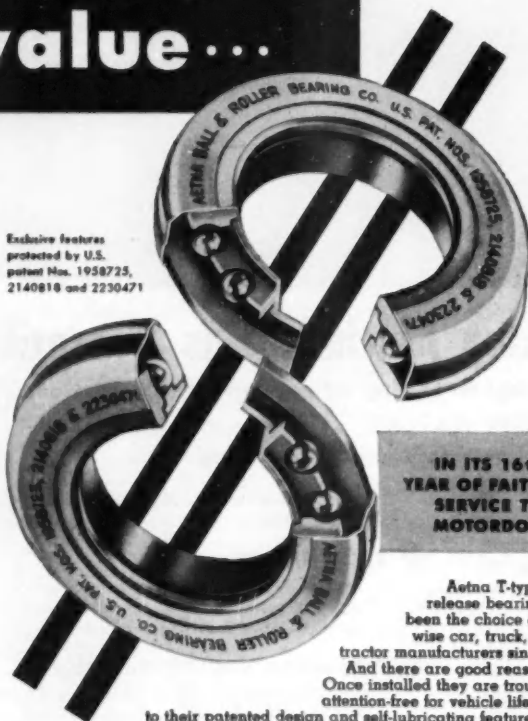
The scavenge oil pump is duplex type, having one intake from each end of the engine sump. The oil pressure pump is fitted with a large capacity relief valve set to open at 100 psi as protection against excessive pressure on the pump gears under extreme low temperature conditions. In addition, a normal pressure relief valve is fitted to control the pressure to the main bearings, and there is an auxiliary circuit operating at about six psi, supplying oil to the valve gear. Under normal temperature conditions the low pressure is kept constant, irrespective of the condition of the bearings which it lubricates. There is a very limited use of ball bearings in this engine.

The unit-construction C.A.V. fuel injection pump, mounted in the angle formed by the two banks of cylinders, has eight pumping elements of the constant stroke type. Integral with the pump body is a pneumatic type governor connected to a venturi mounted on the intake manifold.

All aluminum surfaces are treated to resist corrosion. To assure proper temperature control, a new pressure balanced thermostat has been developed. This unit is completely unresponsive to pressure differences in the cooling system, so that it does not tend to change its operating temperature as the engine speed is varied.

# Sure sign of value...

Exclusive features  
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YEAR OF FAITHFUL  
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MOTORDOM

Aetna T-type clutch release bearings have been the choice of value-wise car, truck, bus and tractor manufacturers since 1934.

And there are good reasons why: Once installed they are trouble-free, attention-free for vehicle life. Thanks

to their patented design and self-lubricating features there's no need of costly machining operations for oil lines or grease fittings—no need of further maintenance whatsoever. Think what that means in increased assembling efficiency and lower assembly costs, in cementing the vehicle owner's good will.

It's a trusty sign of dependability and economical performance in any vehicle—the famous Aetna T-type bearing. Investigate. Find out the many other sound reasons why Aetna deserve a place in your specifications.

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WITH THE... THAT TAMES TROUBLE

## BOOKS . . .

PRINCIPLES OF AIRCRAFT PROPULSION MACHINERY, by Israel Katz, published by Pitman Publishing Corp., New York, N. Y. Price \$6.50. Covering historical data as well as current achievements, this book will aid the reader in increasing his knowledge of aircraft powerplants and in determining the real worth of present equipment. Analytical and descriptive material are effectively balanced and theory is integrated with practice.

SYMPOSIUM ON LUBRICATION OF HIGH-SPEED TURBINE GEAR EQUIPMENT, published by American Society For Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price \$0.75. This publication includes four technical papers dealing with operating problems, design problems, accomplishments in perfecting gears and lubricating systems, and possible improvements yet to be realized.

## Classified Advertisement

DESIGN ENGINEER — Engineering graduate with knowledge of hydraulics and tractor or automotive experience. Familiarity with farm implements desirable. Will be responsible for complete projects on tractor hydraulic systems and components.

PRODUCTION ENGINEER — Engineering graduate with experience in automotive or tractor production plant. Knowledge of hydraulics desirable. Must be familiar with foundry, press and machine shop techniques. Should understand manufacturing costs and be interested in cost reduction. Will assist designers in engineering for minimum cost. Handle production liaison and assist in development and application of new materials and production methods. Send complete details to Personnel Department, Pacific Division, Bendix Aviation Corporation, 11600 Sherman Way, North Hollywood, Calif.

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# 33% BETTER PRODUCTION

*... Longer Tool Life*

*... Better Finish*

## WITH J&L FREE-CUTTING "E" STEEL

... THE NEW FREE-CUTTING BESSEMER SCREW STOCK

Hundreds of profit conscious machine shops throughout the metal-working industry have switched to J&L "E" Steel to ensure dollar savings through longer tool life and increased production.

Here's a report from a typical independent shop which produced the parts shown actual size at right:

"J&L 'E' Steel machines very well ... the finish obtained has been excellent ... our tool life has been increased ... we have been able to realize 33% better production. We are interested in changing all our specifications to your new 'E' Steel."

These are reasons why J&L "E" Steel has been so enthusiastically accepted throughout the industry. But there are others—four years of exhaustive field testing in over 100 applications proved J&L "E" Steel's superiority. Now since "E" Steel has been

on the market, 80% of the new users report:

- ★ Better Machine Finish
- ★ Longer Tool Life
- ★ Higher Speeds
- ★ Machinability Ratings up to 170
- ★ Better Response to Forming and Cold Work

J&L "E" Steel is made in three grades: E-15, E-23, and E-33, each within the composition limits of the standard bessemer screw steels and with similar tensile properties.

Investigate the production economies you can gain with J&L "E" Steel. Write today for your free copy of the booklet "Faster Machining... Smoother Finish... Longer Tool Life." It will give you additional information on properties, grades and their equivalents, and applications.

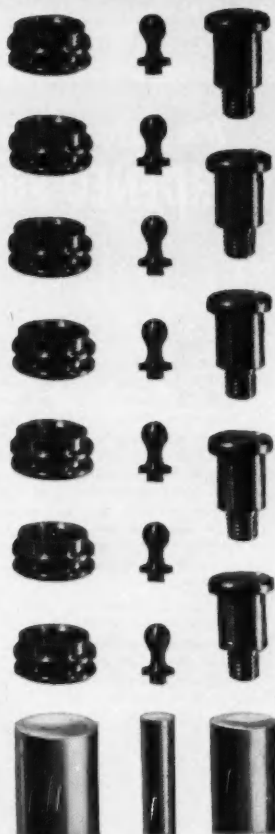
"E" Steel (U.S. Pat. No. 2,484,231) is easily identified by the distinctive blue color on the end of every bar.

## JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY and JALLOY (bi-tensile steels).

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COMPANY \_\_\_\_\_

## New Offenhauser Engine

(Continued from page 47)

engine. Gears are ball bearing mounted, and splash lubricated. Gear material is 4620 steel with induction hardened teeth.

The cylinder block is a single piece, nickel-iron casting with integral head. The combustion chamber is the pent-roof design, accurately cast for uniformity. The block is fastened to the crankcase by 12 studs, one-half in. in diameter. The aluminum crankcase is the barrel type to insure rigidity and

simplicity, and incorporates a dry sump base. Large hand holes are provided for assembly purposes, covered by side plates. Manganese castings, bolted to crankcase webs, form the bearing supports.

Connecting rods are 7½ in. long, fabricated from 4340 drop forgings and are of tubular design. Strengthening ribs are machined integral connecting to bolt bosses. Rod bolts are ½ in. in diameter and relieved for additional

strength and tightened to 50-60 lb ft torque. Although no locking means is provided, the nuts have always remained secure. The crankshaft is machined from a solid round billet of 4340 steel, heat treated to a hardness of 25-38 Rockwell C. There are five main bearings 2½ in. diameter with 2½ in. diameter crankpins. Pins and journals are drilled for lightness and oil is retained by dural plugs, held in place by ¼ in. bolts. All shafts are counterbalanced for bearing load reduction and added smoothness. The weight of shaft complete is 67 lb and all shafts are Magnaflexed for flaws before use.

The connecting rod bearings are steel-backed inserts with F-77 copper-lead lining and the main bearings are steel-backed Micro type tin-base babbit lining.

Pistons are permanent molded from aluminum alloy and when machine finished weigh 20 oz. Three rings are used: Top and second ring are 3/32 in. wide and the oil ring is 5/32 in. wide. Piston pins are 1 1/16 in. diameter, floating type, of 4340 steel, located by aluminum retaining buttons. Piston skirt clearance is 0.014 in. and have an eight to one compression ratio dome. The four piston and rod assemblies are accurately balanced to within 2 grams.

Lubrication is by double oil pump running at approximately one-half engine speed. The pressure pump forces oil to the connecting rod and main bearings at 75 to 80 psi, and at 5 psi for camshaft bearings. The capacity of the scavenging pump is 10 gpm. Number SAE 50 mineral oil is generally used with an optimum temperature of 180 F. An oil filter is also desirable.

Engine cooling is by centrifugal pump with a capacity of 18 gpm. Engine temperature is maintained to about 170-180 F.

Ignition is by special racing magneto driven at engine speed through a pair of mitre gears. Spark plugs are 18 mm size and are the long reach type with the gasket placed at the bottom of threaded diameter for maximum heat dissipation. Spark plug location is on the cylinder center-line, the so-called cartridge type arrangement being used. Spark setting is usually 35 deg BTC.

The supercharger is the centrifugal type mounted at the rear of the engine directly behind the cylinder block. The supercharger impeller, which rotates on an axis parallel to the crankshaft, is driven by a train of three gears—driving gear, idler, and impeller pinion. The hub of the drive gear is designed to take compression coil springs to control shock loading induced by sudden acceleration and deceleration of the engine because of the high impeller inertia forces. No diffuser is used, for the spiral housing surrounding the impeller gradually increases in area to the proper outlet size, converting the incoming charge, thrown off by the high velocity of impeller blades from kinetic to pressure energy. The impeller, which

(Turn to page 84, please)

## Manufacturers of... HARDENED and GROUND PARTS for over 40 years

**S**INCE the day of the duster and goggles, The Brown Corp. has meant highest quality precision parts for the automotive industry. Today, Brown Parts serve trucks, tractors, trailers, buses, axle builders, off-the-road machines and Diesel locomotives. The production methods and facilities we have developed are unexcelled—uniform product quality is assured—deliveries are reliable—service is efficient. Ask any of our long list of satisfied customers throughout the industry.

For further information about our specialized production of hardened and ground automotive and industrial parts, just drop us a note. We invite an opportunity to quote on your work.

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PRESIDENT



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Idle Shafts  
Stub Axle Shafts  
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... anything in the hardened and ground line, of any analysis steel, up to 4½" diameter.

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## NOC-OUT HOSE CLAMPS

*The Standard  
of the Automotive  
Industry*



Type A—Radiator  
Hose Connections



Type HP—High  
Pressure Hose  
Connections

Type G-BB—Booster  
Brake Hose Connections  
No. G-B-HM  
for Hot Water  
Heater Hose

Wittek Noc-Out Hose Clamps are designed in a variety of types made in many sizes for use by the automotive industry. Because they provide the most practical leakproof hose connection, they are specified by the leading manufacturers as standard, original equipment for automobiles, buses, trucks and tractors.

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*Dependability in Hose Clamps  
for Over a Quarter of a Century*

is machined from a magnesium forging, has 24 blades and is accurately balanced. Its outside diameter is 8 1/2 in. It is geared 5.35 times crankshaft speed and delivers 25 psi at 6000 engine rpm. An after-cooler is used between supercharger and intake manifold. Pop-off valves are mounted on each end of the manifold in case of back-fire.

The pinion gear, which rotates approximately 32,000 rpm, is mounted on two precision ball bearings, although plain bearings are to be tried at a later date. Impeller oil leakage is controlled by means of a labyrinth-type piston ring seal.

Either two side-draft carburetors mounted on a common manifold, or one single carburetor is used. Also, fuel injection is being tested, with good results.

No starter is provided because of weight factors; however, a starter take-off is provided on the front of the engine to accommodate a portable electrical starter.

It will be interesting to watch these engines in competition with our big 270 cu in. non-supercharged engines during the 1950 racing season.

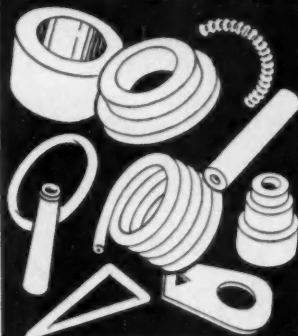
## A New Stainless Steel Produced

A new Chrome-Nickel austenitic stainless steel for economical production of such stainless steel parts as cold headed bolts and recessed head screws, cold upset and punched nuts, and parts that require severe cold coining and extrusion is being put out by the Carpenter Steel Co., Reading, Pa. Characteristic of the new material is that it work-hardens much slower than the conventional 18-8 types of stainless, and is therefore well suited to fabrication of fastenings and similar parts by drastic cold heading or upsetting. The new stainless is cited as being particularly useful in automotive applications where corrosion resistance equal to that of the 18-8 steels is desired. Because the material remains non-magnetic after severe cold working, it also has application in the making of parts for precision instruments.

The corrosion resistance of Carpenter Stainless No. 10 has been found to be as good as, or slightly better than, that of the conventional Types 302, 304 and 305. It resists a wide variety of organic and inorganic chemicals. No. 10 resists nitric acid well, sulphuric acid moderately. It is not recommended for use with hydrochloric and other halogen acids.

This new stainless steel is being produced on a commercial scale in the forms of forging billets, hot rolled bars and forgings, cold drawn and ground bars, wire and wire rods.

# Chemical Resistant RUBBER PARTS



## FEATURE LONG SERVICE LIFE UNDER HIGHLY CORROSIVE CONDITIONS

Excellent resistance to chemicals, both concentrated and diluted, is featured by custom rubber parts fabricated from new specially-compounded stocks developed by The Stalwart Rubber Company. These new stocks are recommended for applications in which parts are subject to aniline, acetone, ethyl chloride, and numerous other chemicals.

Stalwart's special compounds also feature high resistance to animal fats, vegetable oils, ozone, oxygen, acids, alkalis, steam, extreme weathering, sunlight and dry heat.

Rubber parts made from these compounds have outstanding flex and abrasion resistance, and dielectric properties make them suitable for use in electrical equipment.

The Stalwart Rubber Company is prepared to mold, extrude, and die-cut custom rubber parts in limited or production quantities from special or standard stocks. Recommended applications include seals and stoppers for chemical containers, gaskets and washers for systems handling highly corrosive acids or alkalis, tubing for installation in corrosive atmospheres or for conveying diluted or concentrated chemicals.

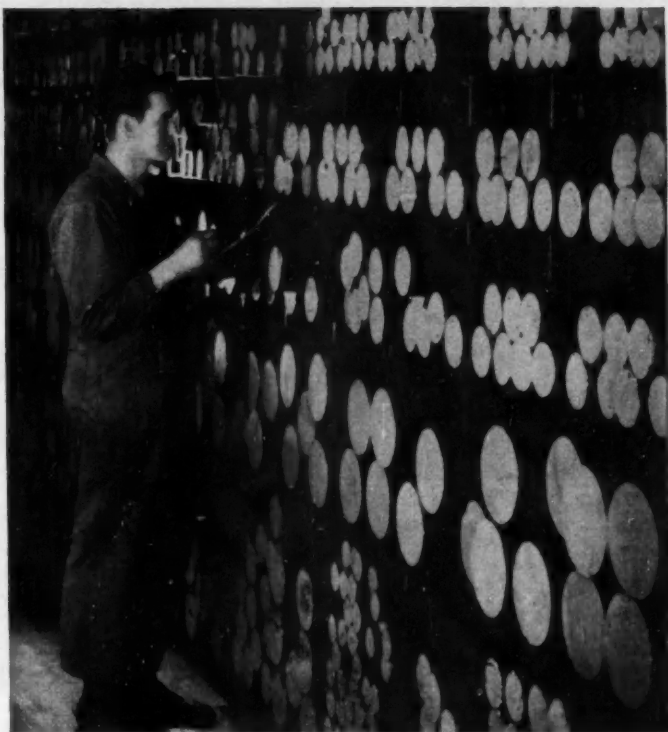
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An outstanding example: Recently a manufacturer of industrial equipment submitted for our advice 40 different specifications he had been using, involving many

different analyses of steels and a wide variety of mechanical properties. As a result of their study our metallurgists were able to reduce the requirements to 2 specifications that involve only 2 grades of steel and 2 sets of mechanical properties. The manufacturer followed this recommendation, and has made substantial savings.

By simplifying your alloy-steel requirements you obviously reduce the possibilities for error; you

can order in larger quantities; and you can usually get better deliveries. We will be glad to give you sound metallurgical advice and help solve your problems on specifications, grades and properties.

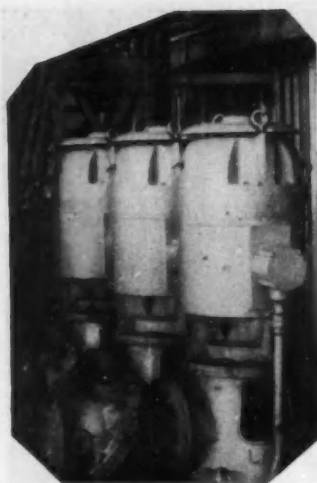
We manufacture all the various AISI steels as well as special grades of alloy steel for every purpose.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation  
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## Good Features

Industrial Plant Superintendents, Water Works Engineers and Municipal Executives throughout the nation readily agree that Layne Well Water Systems and Layne Vertical Turbine Pumps have more good features than any other make. Such acceptance is due to Layne's extraordinarily fine designing, precision manufacturing and definitely superior installation methods. Furthermore there is a distinct advantage in owning water producing equipment built by an organization that is always ready and in a position to provide efficient repair and maintenance service when—and if needed. Hundreds of large water users of all kinds have found Layne equipment to be thoroughly dependable under every condition.

If you are in need of more water or want to consider the installation of a system of your own, the Layne organization is ready to offer experienced exploratory service, sound engineering advice and dependable construction plans. You incur no obligation in asking for this aid. For such service, catalogs, bulletins, etc., address

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## Publications Available

(Continued from page 56)

load capacity charts, together with a table of dimensions for the Type NU and ND units are included.

### H-88 Battery Handbook

The Gould Storage Battery Corp.—A revised edition of the 40-page pocket-size handbook of technical instructions and engineering data on the care of motive-power storage batteries is available. A new section is included on the theory of the lead-acid battery. Following the theory section are the chapters on: Care and Operation; Maintenance and Repairs; Parts; and Technical Data.

### H-89 Torque Arm Speed Reducers

Dodge Manufacturing Corp.—Bulletin A-470, on the new Dodge Torque-Arm Speed Reducer, is a 16-page brochure which presents the complete story, augmented by full-size photographs of the entire mechanism; and simplified selection tables.

### H-90 Program Controls

Wheelco Instruments Co.—A new bulletin describing automatic time-temperature program controllers has been released. A schematic drawing of a typical time-temperature program, a listing of models, time cycle ranges and prices are included in the bulletin (No. CH-1.)

### H-91 Slitting Lines

The Yoder Company—A new 76-page book on Yoder Slitting Lines for coiled strip and sheets traces the evolution of multiple rotary slitters and explains basic considerations in the selection of equipment. Tables of production records are given. Another subject discussed is the training of operators.

### H-92 Surface Grinder

Mattison Machine Works—The No. 24 Duplex Rotary Type Surface Grinder is described and illustrated in a new bulletin. General description of the machine is included, and a page of specifications.

## Rover Gas Turbine Car

(Continued from page 40)

any production is undertaken. Rear mounting of the engine was entirely a matter of convenience.

Work on this automobile has been carried out in secrecy by a small group of engineers, headed by Spencer B. Wilks, managing director of the company; his brother, Maurice C. Wilks, chief experimental engineer, and F. Bell, turbine engineer.

### RAC Report

The Royal Automobile Club report stated: The Rover Co. entered a car fitted with a gas turbine power plant for test. General design of the car, apart from the power unit and transmission, was on conventional lines and its external appearance normal. Its wheelbase was 111 in. and tread 52 in.

Tests were held on the Motor Industry Research Association Proving Ground circuit, at Nuneaton, Warwickshire, and at the time of the test the surface was dry, the weather calm and the wind speed 5 mph, temperature 54 F, barometer 30.1 in. Hg.

The entrant intended the test to show the progress achieved by the Rover Co. in the application of the gas turbine as a power plant for road vehicles.

The fuel used was kerosene. Starting was by a normal car type electric starter, with push button on the instrument panel. The time taken to start the power unit and run up to idling speed was 13 1/5 sec, and the car moved forward after another 3 2/5 sec.

Control from standstill to maximum speed was solely by means of the accelerator pedal, the only other driving

control being the brake pedal. The reverse gear was operated by a lever which functioned normally.

Five laps of the circuit of the Proving Ground measuring approximately 2.75 miles per lap, were covered by the car, during which the Royal Automobile Club observers traveled alternately as drivers and passengers.

No attempt was made to attain maximum speed, but during the course of the test a speed exceeding 85 mph was readily attained, at which speed the compressor - turbine tachometer indicated 35,000 rpm. In a test of acceleration from a standstill, the car attained 60 mph in 14 sec.

Although no provision for silencing the exhaust was observable, the volume of noise was not excessive nor unpleasant, but was naturally accentuated during acceleration.

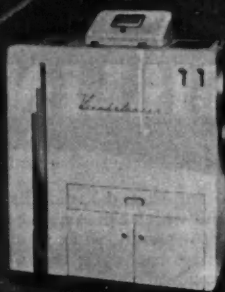
## BOOKS...

**ASTM STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS**, prepared by ASTM Committee D-2, published by American Society For Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price \$5.50 (paper cover), \$6.15 (cloth cover). This latest compilation brings together in compact, readily usable form, most of the ASTM standards, test methods, and specifications widely used in this field. Given in this edition are 120 ASTM standards, including 102 test methods, 12 specifications, and two lists of definitions, plus a wealth of other information. Illustrations are used where it is necessary to supplement the text.



# Saves \$1120 per day

## Hardening These Shafts



*This John Bean Vimbalance—for checking out-of-balance automobile wheels, uses a TOCCO-hardened main shaft (shown above) to insure long life of wearing surfaces.*

## with TOCCO\* Induction Heating

- If your plant operations include hardening, brazing, soldering or heating for forging of ferrous or non-ferrous metals, savings such as experienced by John Bean Division of Food Machinery and Chemical Corporation can probably be accomplished in your plant, too.

**TOCCO is Economical**—Cost of hardening this shaft was reduced by \$2.00 when TOCCO replaced conventional heat-treating methods. TOCCO also made possible redesign of shaft which reduced its weight 12½ lbs.—a very important additional savings.

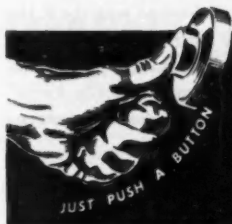
**TOCCO is Fast**—Entire heating and quenching cycles take only seconds, floor to floor time less than a minute. Production is 70 per hour, using 100 KW, 10,000 cycles.

**TOCCO Stops Rejects**—Distortion is no longer

a problem because automatic TOCCO doesn't heat the whole shaft—just those areas which require hardening. Rejects due to variation in heat-treating are eliminated because TOCCO is automatic—produces identical results—on two parts or two million.

**TOCCO Engineers**—can probably find applications in your plant, too, where TOCCO Induction Heating can increase output and cut unit costs. Such a survey costs you nothing—and may save you a great deal.

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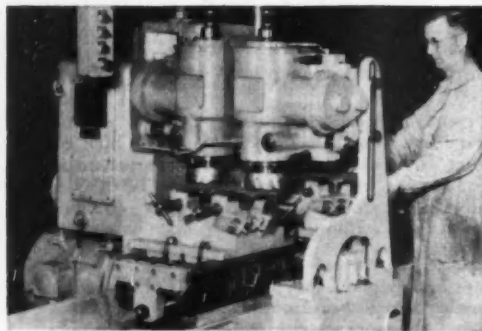
Please send copy of "A TOCCO Plant Survey—Your Profit Possibility for 1950"

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# Here's what can be done with Standard Rigidmils.. **TO SOLVE SPECIAL MILLING PROBLEMS!**

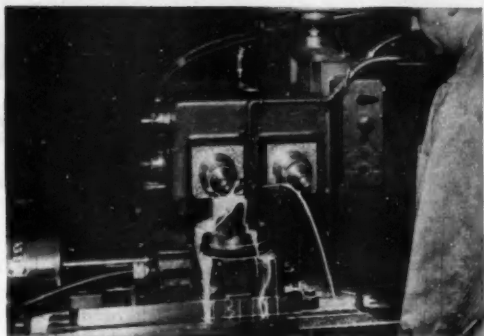
On standard Sundstrand Rigidmils, the head is a self-contained unit which can easily be replaced with a special head. Consequently, when production or work requirements permit machining several surfaces simultaneously, the standard head can be replaced with a special head, and a *special* job done with the lowest possible capital investment. Furthermore, putting into effect product changes (a difficult problem for many production engineers) doesn't worry anybody in plants where Rigidmils are installed. As these machines can be converted so readily to meet product changes, they represent a combination of maximum production with minimum capital investment. Here are six good examples of standard Rigidmils "engineered" to a production job with "only the head as special."



## **Standard Rigidmil With Two Special Vertical Heads Mounted On Cross Rail**

Two top pads on thin, cast iron sewing machine bases are milled simultaneously. The table holds two fixtures, one at each end. Operator loads at one end while part is being milled at opposite

end. Thus, loading time is free and production increased. Each spindle mills one pad on part, and heads are adjustable on cross rail to facilitate handling a number of different sizes of parts—a good example of special milling production using a standard Rigidmil with only the head being special.

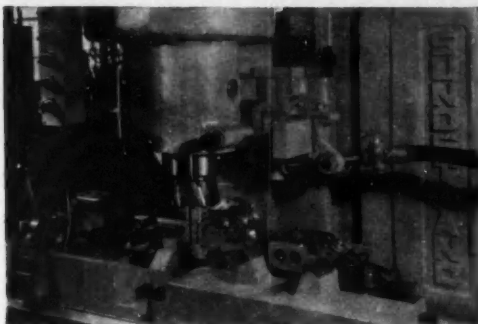


## **Standard Rigidmil With Special Two-Spindle Horizontal Head**

This machine form-mills the teeth in steel clutch drive shafts. Each tooth has a radial undercut on both sides so that the teeth cannot be straddle milled with one cut. For this reason, the standard head was replaced with a special two-spindle head. With an automatic index base centrally located on the table between the spindles, one side of the tooth is formed with the R.H. cutter and the opposite side with the L.H. cutter. After loading the part the operator merely pushes the start button. The machine then automatically forms the teeth by alternate cutting and indexing between the two cutters.

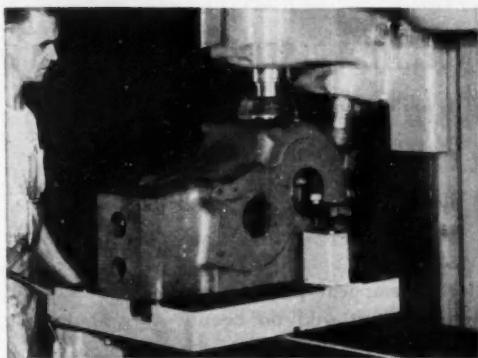


**RIGIDMILS • FLUID SCREW RIGIDMILS • AUTOMATIC LATHES • HYDRAULIC EQUIPMENT**



### Standard Rigidmil With Regular Horizontal Spindle and Special Vertical Spindle

Each spindle carries one carbide tipped cutter. Two fixtures are mounted on the machine table. In L.H. fixture, 2 right angle surfaces of a cast iron manifold are machined, one by horizontal spindle and one by the vertical spindle. Part is then transposed to the R.H. fixture (located from previously milled surfaces) and a 3rd surface is machined with the horizontal spindle. Table cycle is automatic so operator can load at one fixture while part is being milled in opposite fixture.

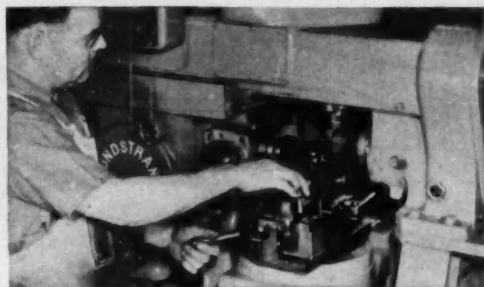


### Standard Rigidmil Has Special Head With Vertical and Angular Spindles

The special angular spindle permits the milling of an angular pad simultaneously with a flat pad on top of tractor frames. These frames, held in a simple, quick-clamping fixture, are milled at the rate of 32 per hour.

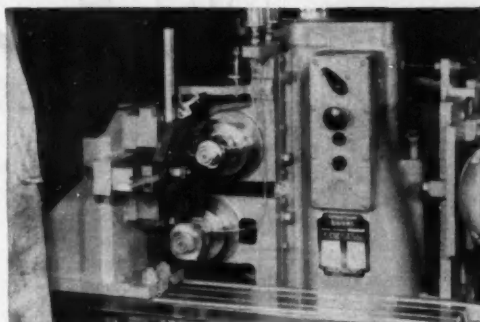
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### Standard Rigidmil With Special 3 Spindle Head

Three sides of a compressor part are milled on this Rigidmil. Machine also has automatic index fixture so that a part can be loaded in one station while another part is being milled in the 2nd station. Loading time is free and a production of approximately 172 pieces per hour is obtained. Three surfaces are held accurately in relation to each other.



### Standard Rigidmil With a Special Two Spindle Horizontal Head

The two horizontal spindles are offset so that while the lower spindle feeds through the diameter of the shaft the upper spindle mills through the O.D. of the shaft, to form the slot in a steel center drive tubing for a washing machine. A simple, manually operated work-holding fixture holds one piece at a time, and an automatic table cycle of rapid approach, feed and rapid return is used to complete 74 pieces per hour.

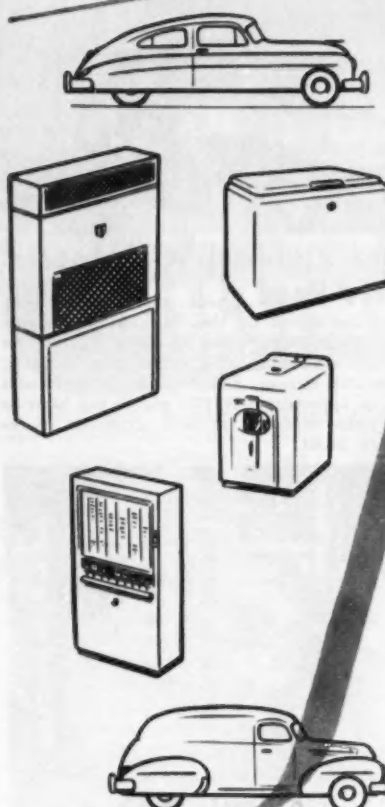


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Your opinion as a reader of MOTOR AGE is most valuable to us. It will guide the Editors in preparing the magazine and aids them in digging out the information you want!

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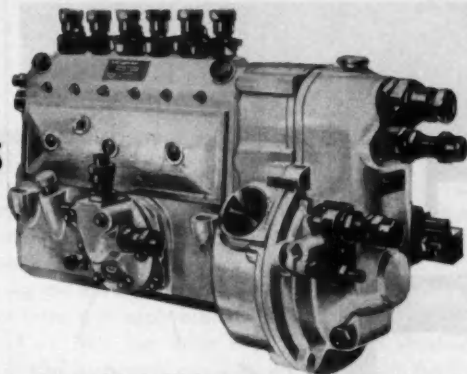
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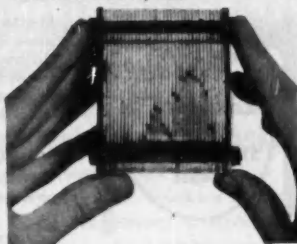
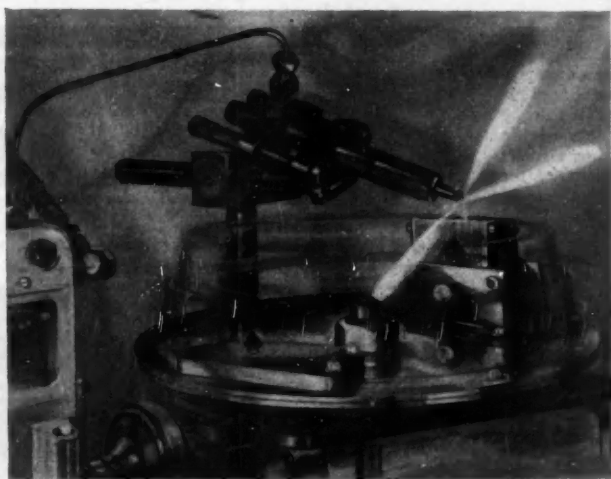
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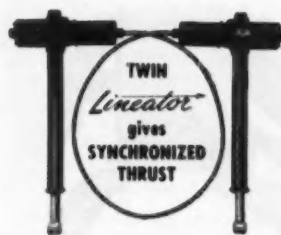


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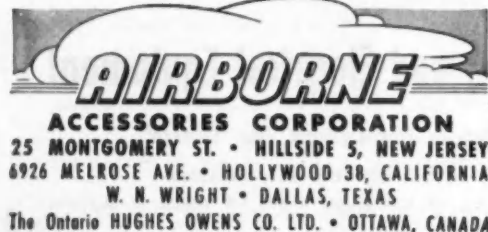
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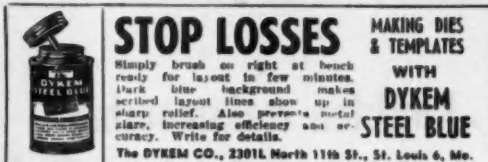
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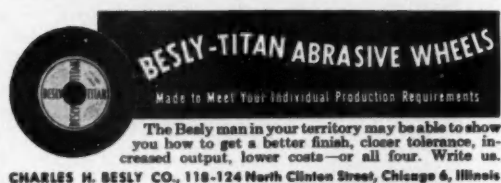
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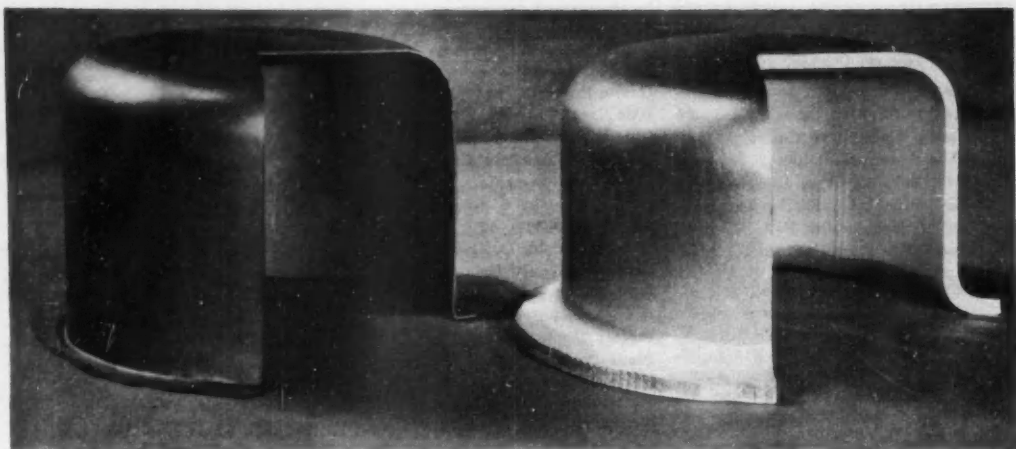
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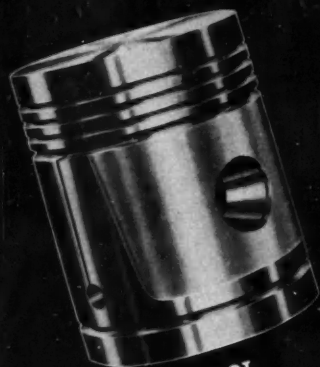
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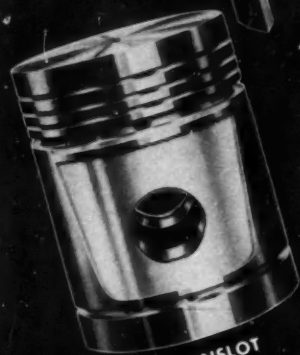
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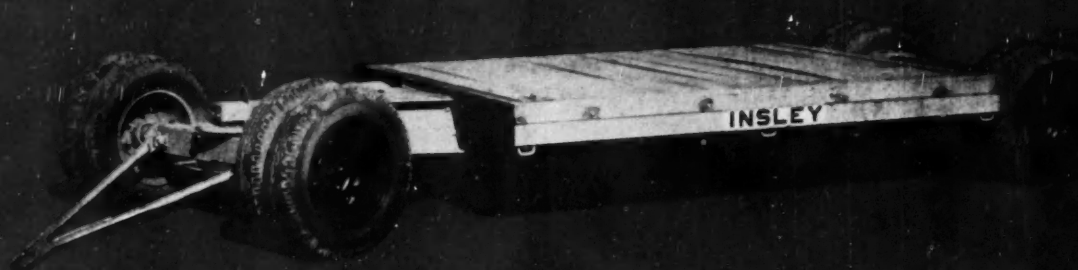
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